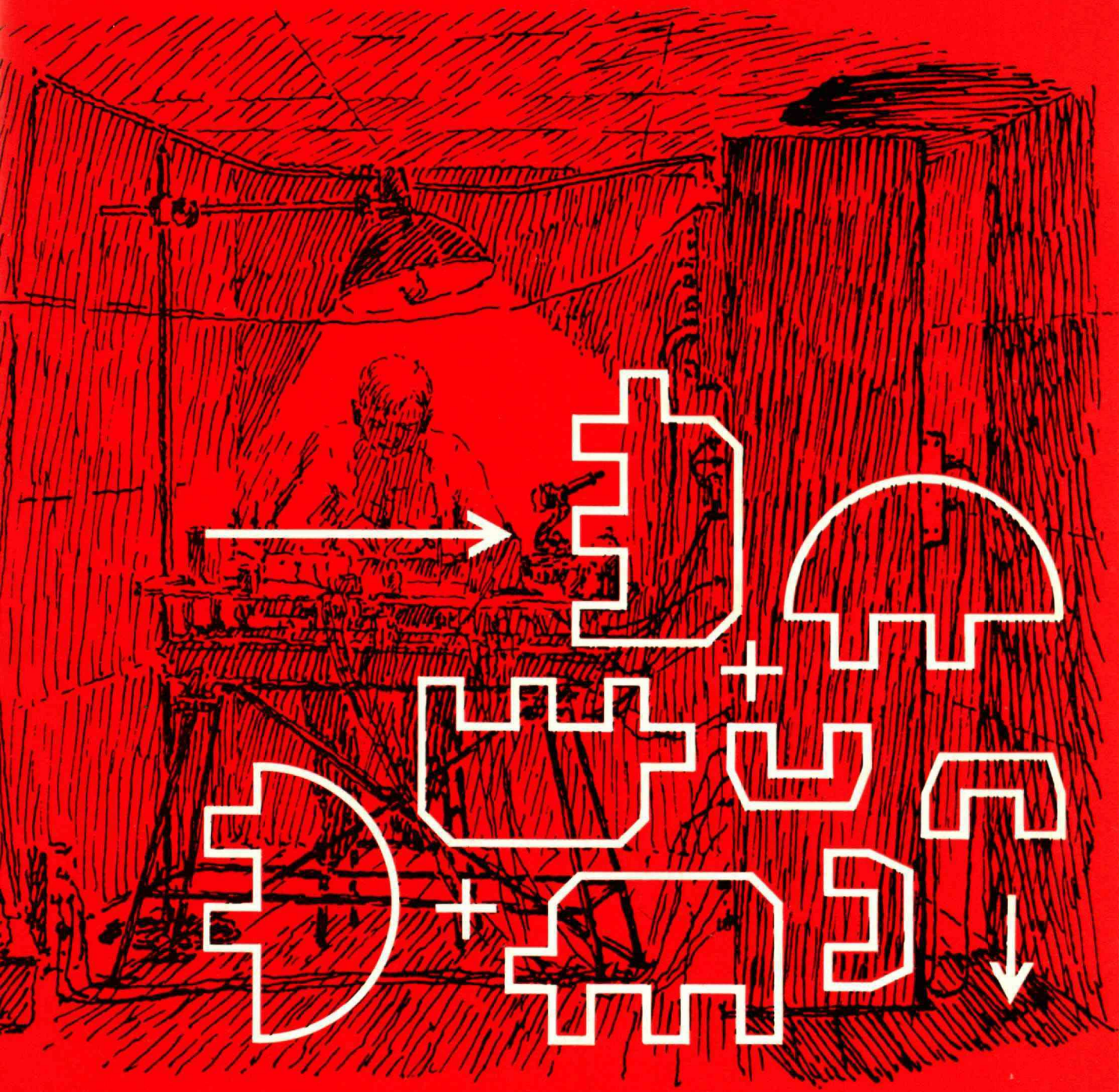
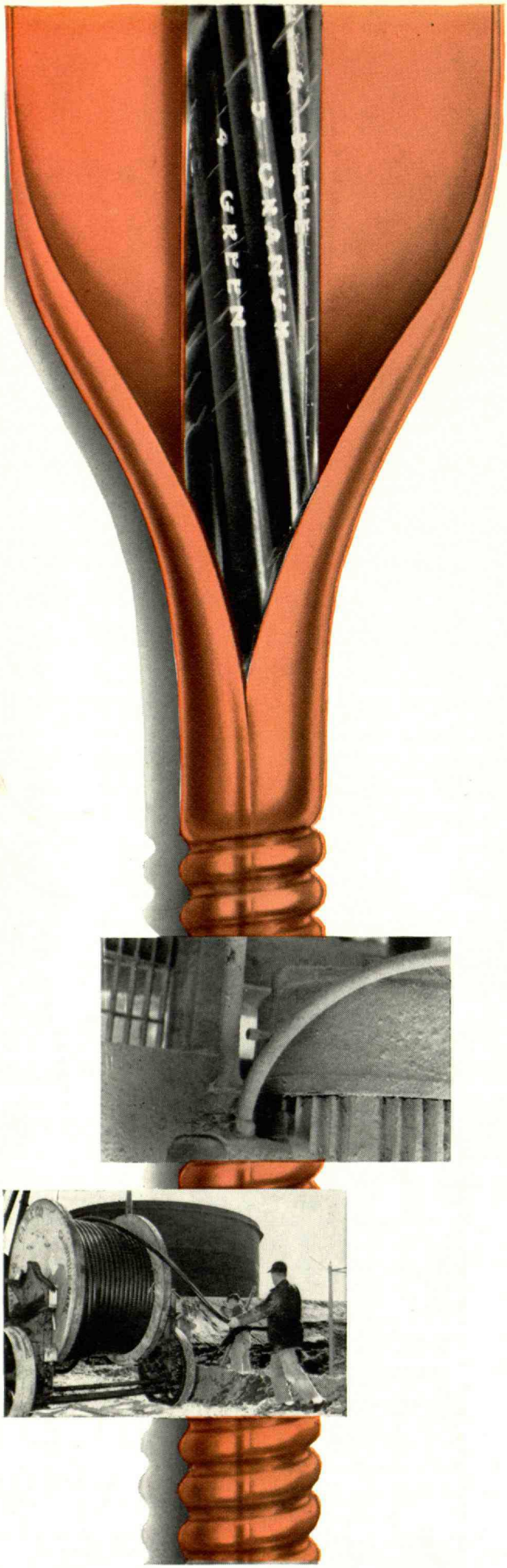
Technology Review



February 1961: A Survey of Work in Biology at M.I.T.

technology
review
Published by MIT



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Continuous Lightweight eXterior

Sealed Cable Systems by Simplex Can do so Many Jobs so Well

Simplex C-L-X is a packaged combination of cable and an extremely pliable, corrugated metal sheath. It requires no separate duct or conduit regardless of environment. It is available with steel sheath and plastic jacketing; and with copper or aluminum sheaths, with or without plastic jacketing.

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Conduit life in this company's calcium chloride reclamation building was only 6 to 9 months. The conduit was replaced with a C-L-X cable system which — after two years of operation, shows no signs of deterioration.

Protects Against Liquids and Gases

An East Coast petroleum tank farm used a C-L-X 8-conductor cable protected with PVC for direct burial in ground that was saturated with oil, gas and water. Result: Perfect performance at a sizeable savings over conduit systems.

Only Simplex C-L-X offers you: Exceptional Strength . . . Unequalled Pliability . . . Protection from Liquids and Gases . . . Faster Installation and Lower Costs. Send for Illustrated Brochure containing Application and Engineering Data.

SIMPLEX WIRE & CABLE Co.

CAMBRIDGE, MASSACHUSETTS

This is Cabot / #5 of a series

Picture of a Pigment Going to Market

Loaded in this train is a little pigment called Cab-O-Lite.® It's not new, actually. Cabot mines it from the ground in New York state, where Nature has had it on tap for lo these many eons.

But when Cabot processes it and sends it to market, this little pigment makes happy things happen to products. It's what you might call a "profit-making" ingredient for a lengthy list of products extending all the way from plastics and ceramics to paint.

In **plastics,** for instance: put Cab-O-Lite in polystyrene as a filler, and you transform what is already a low-cost material into one that costs even less — 10% less in raw material costs.

In **ceramics,** for instance: Cab-O-Lite makes wall tile and other ceramic products look better and last longer — makes possible better shock resistance, less shrinkage, higher strength, less warpage.

In **paints,** for instance: as an extender, versatile Cab-O-Lite keeps colored house paints looking beautiful longer, and makes white house paints more durable at a cost of 4–5¢ less than with any other acicular extender.

Cab-O-Lite is just one of an expanding line of quality Cabot raw materials currently helping industry produce better, more economical products. For instance:

For Industry, from Cabot:

CARBON BLACK — the world's most complete range . . . more than 50 different grades, each with a specific industrial use.

CAB-O-LITE® (Cabot wollastonite)—as a paint pigment, this versatile, uniform calcium silicate has more desirable properties than other extenders used singly or in combination. Excellent for all types of paint, and for all types of ceramics.

PT® PINE TAR PRODUCTS — these versatile quality controlled materials improve the performance of a wide variety of products, including: rubber, paint, cordage, oakum and insecticides.

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OTHER PRODUCTS INCLUDE: CHARCOAL, CHARCOAL BRIQUETS, OIL, NATURAL GAS, NATURAL GASOLINE, LIQUEFIED PETROLEUM GASES, PORTABLE WELL DRILLING AND SERVICING EQUIPMENT, OIL FIELD PUMPING EQUIPMENT AND STEEL FABRICATION.

For complete information, phone or write:

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Model of the new Hall of Justice now under construction in San Francisco, California. Completion of building is scheduled for 1961.

Phelps Dodge Copper Tube

Specified for the Plumbing Lines of San Francisco's New Hall of Justice!

Within the superb new Hall of Justice being constructed for the City and County of San Francisco will be over a quarter million pounds of Phelps Dodge copper water and DWV tube serving as plumbing lines for this completely modern structure.

The new Hall of Justice will bring together under one roof all the functions of the city and county related to law enforcement. Among the novel features will be a heliport located on the roof.

General contractors for the project are the M & K Construction Corporation, while J. B. Nettles & Co., Inc. is the mechanical contractor and G-M-Simonson, the electrical and mechanical engineers. Project architects under the direction of Bureau of Architecture, Department of Public Works, are Weihe, Frock & Kruse, together with the City Architect, Charles W. Griffith. The plumbing distributor is P. E. O'Hair and Co. of San Francisco.

* * *

From the Golden Gate to Gotham, plumbing contractors know they can rely on the quality of Phelps Dodge famous "Mine-to-Market" tube and pipe. That's why so many of them specify Phelps Dodge for every kind of installation!

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Technology Review

Reg. U.S. Pat. Off

Volume 63, Number 4 *Edited at the Massachusetts Institute of Technology* *February, 1961*

Feedback

The Review's Format

FROM JOHN E. BURCHARD, '23:

I have been admiring the new format of The Review. Congratulations!

Dean, M.I.T. School of Humanities and Social Science

Names in Bold Type

FROM EMIL D. RIES, '23:

Congratulations on use of bold type for names in the Class Notes. Don't know when I've enjoyed reading them more. Don't let anybody talk you out of this improvement!

4603 Weldin Road
Wilmington 3, Del.

The Hart Nautical Museum

FROM EVERS BURTNER, '15:

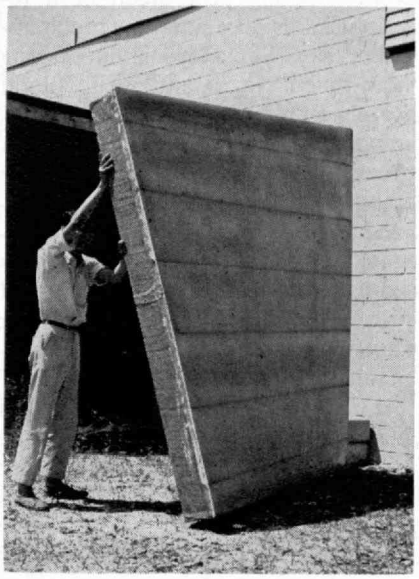
An addition to the notes from retired professors in December's Technology Review (pages 35 to 38).

Although listed as emeritus I carry on as lecturer in the Department of Naval Architecture and Marine Engineering. My specific assignments have covered the responsibility of one undergraduate course and the supervision of the Francis Russell Hart Nautical Museum. This last has also included the issuing of copies of design plans of yachts from the many in the museum files.

My wife and I have been most fortunate in the two extended trips we have enjoyed in the years since my extended retirement (to Hawaii and to Europe). . . . Have turned out some technical writing and other professional work. I also enjoy meeting former students and hearing of their successes.

38 Jordan Avenue
Wakefield, Mass.

NEXT MONTH: *Roger Brown, Associate Professor of Social Psychology at M.I.T., will explain the reasons for the establishment of an independent psychology unit at the Institute.*



THE ROOF *of the plastic schoolhouse that will be erected at M.I.T. this spring will consist of panels such as this young man is holding. This new idea in school construction is described in the article on page 28.*

THE DRAWINGS *which illustrate Professor Rathbone's article on page 29, and others like them which adorn The Review from time to time are the work of Henry B. Kane, '24.*

The Technology Review is published monthly from November to July inclusive, on the 27th day of the month preceding the date of issue, by the Alumni Association of M.I.T.; Clarence L. A. Wynd, '27, President; H. E. Lobdell, '17, Executive Vice-president; Thomas F. Creamer, '40, William L. Taggart, Jr., '27, Vice-presidents; Donald P. Severance, '38, Secretary-Treasurer.

Editorial and business offices are in Room 1-281, Massachusetts Institute of Technology, Cambridge 39, Mass. The Review is published at The Rumford Press, 10 Ferry Street, Concord, N. H.

An annual subscription in the U.S. is $4.00; in Canada and elsewhere, $4.50; a single copy, 60 cents. Three weeks must be allowed to effect a change of address, for which both the old and the new address should be given.

Second-class postage paid at Concord, N. H.

Contents

The Cover

On a sketch by Percy Lund of an Institute biological laboratory, the cover designer superimposed symbols now used in depicting enzyme-catalyzed reactions schematically. Irwin W. Sizer reports on current interests of M.I.T. biologists in the article on page 21.

Individuals Noteworthy

Men of the Year

THREE ALUMNI of M.I.T., Charles Stark Draper, '26, William Shockley, '36, and Robert B. Woodward, '36, were among the 15 "Men of the Year" pictured on the January 2 cover of *Time* Magazine. Two of the others, I. I. Rabi and Edward M. Purcell, were on the staff of the wartime Radiation Laboratory at M.I.T., and another, George W. Beadle, was last year's Arthur D. Little Lecturer at M.I.T.

In its sketch of Dr. Draper, *Time* recalled his definition of a dyne centimeter as "just about the amount of torque that would have to be applied to my arm to get me to take a drink." The achievements of the Head of the Department of Aeronautics and Astronautics and the M.I.T. Instrumentation Laboratory which *Time* mentioned have included "the A-4 gunsight that gave U.S. Sabre jets clear superiority over Russian MIGs in Korea and the inertial guidance systems that control far-ranging U.S. missiles, including the Polaris."

Dr. Shockley, a Nobel prize winner for his work on transistors, was described as "that rare breed of scientist, a theorist who makes no apology for a consuming interest in the practical applications of his work. 'Asking how much of a research job is pure and how much applied,' says Shockley, 'is like asking how much Negro and white blood Ralph Bunche might have. What's important is that Ralph Bunche is a great man.' Hired by Bell Telephone Laboratories right after he graduated from M.I.T. in 1936, Theoretical Physicist Shockley was one of a team that found a use for what had previously been a scientific parlor stunt: the use of silicon and germanium as a photoelectric device."

Dr. Woodward, *Time* said, "is a man with two loves: the color blue and the science of chemistry. The first is an easy affectation; Harvard's Woodward satisfies it with a blue and white office, a blue coffee cup and, day in and day out, a blue necktie. The second is an all-consuming passion. Disdaining all other activities (exercise seems a particular waste of time to him), Woodward has been the architect of some of the most complex biological molecules ever built by man. He synthesized quinine by the time he was 26, kept lengthening the list of his accomplishments—cortisone, strychnine, reserpine, cholesterol—until this year he manufactured the most complicated substance of all: chlorophyll."

Civil Engineers' Head

ROLF ELIASSEN, '32, has been named Acting Head of the Department of Civil and Sanitary Engineering at M.I.T., and John B. Wilbur, '26, has been appointed part-time Consulting Professor of Engineering.

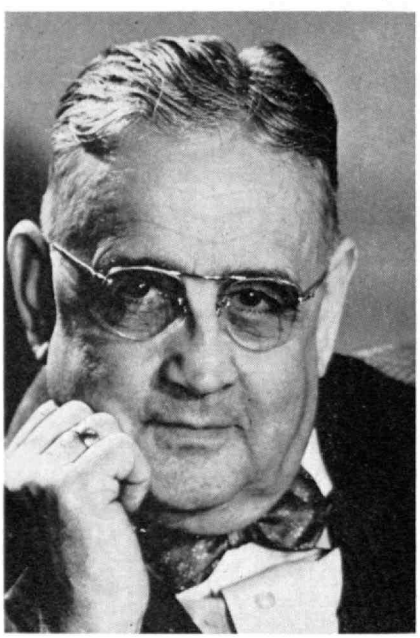
Professor Wilbur, who had served as head of the Department since 1946, asked to be relieved of his administrative duties but the Institute will still benefit from his counsel and support. He and Mrs. Wilbur will make their home in Hancock, N.H.

Professor Eliassen served with two consulting engineering firms and taught at the Illinois Institute of Technology and New York University before joining the M.I.T. Faculty. He has been head of the Division of Sanitary Engineering at the Institute since 1949 and has become widely known for his research in the analysis, purification, and disposal of industrial wastes.

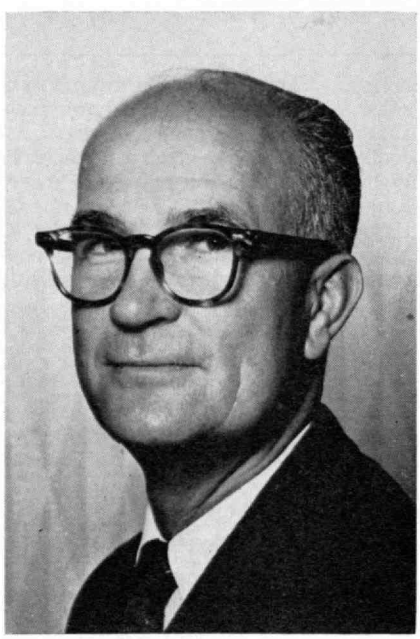
C. D. Howe: 1886-1960

AS THIS ISSUE went to press, news reached the Institute of the death of Clarence Decatur Howe, '07, one of Canada's most distinguished statesmen and a Life Member of the M.I.T. Corporation. His obituary will be in the March issue of The Review.

(Continued on page 6)



Charles Stark Draper, '26



William Shockley, '36

Photos courtesy TIME: Copyright Time, Inc., 1961

Robert B. Woodward, '36

Individuals Noteworthy

(Continued from page 4)

THIS STATUE of Hermes dedicated in October at the Groton, Conn., laboratory of Chas. Pfizer & Co., Inc., was the work of William M. Philips, '47. He is working on architectural sculpture for the 1964 World's Fair.

Faculty and Staff

SAMUEL A. GOLDBLITH, '40, Professor of Food Technology, has been appointed to a committee to consult with the Atomic Energy Commission's Division of Biology and Medicine on radiation processing of food . . . Antoine M. Gaudin, Richards Professor of Mineral Engineering, will lecture at the St. Louis meeting of the American Institute of Mining, Metallurgical and Petroleum Engineers on March 2 . . . Fred G. Lessieur, Lecturer in Industrial Relations, spoke at the Industrial Engineering Institute meeting at the University of California in February . . . Frederick R. Donald of the Instrumentation Laboratory has received a Navy letter of appreciation for his work on Polaris.

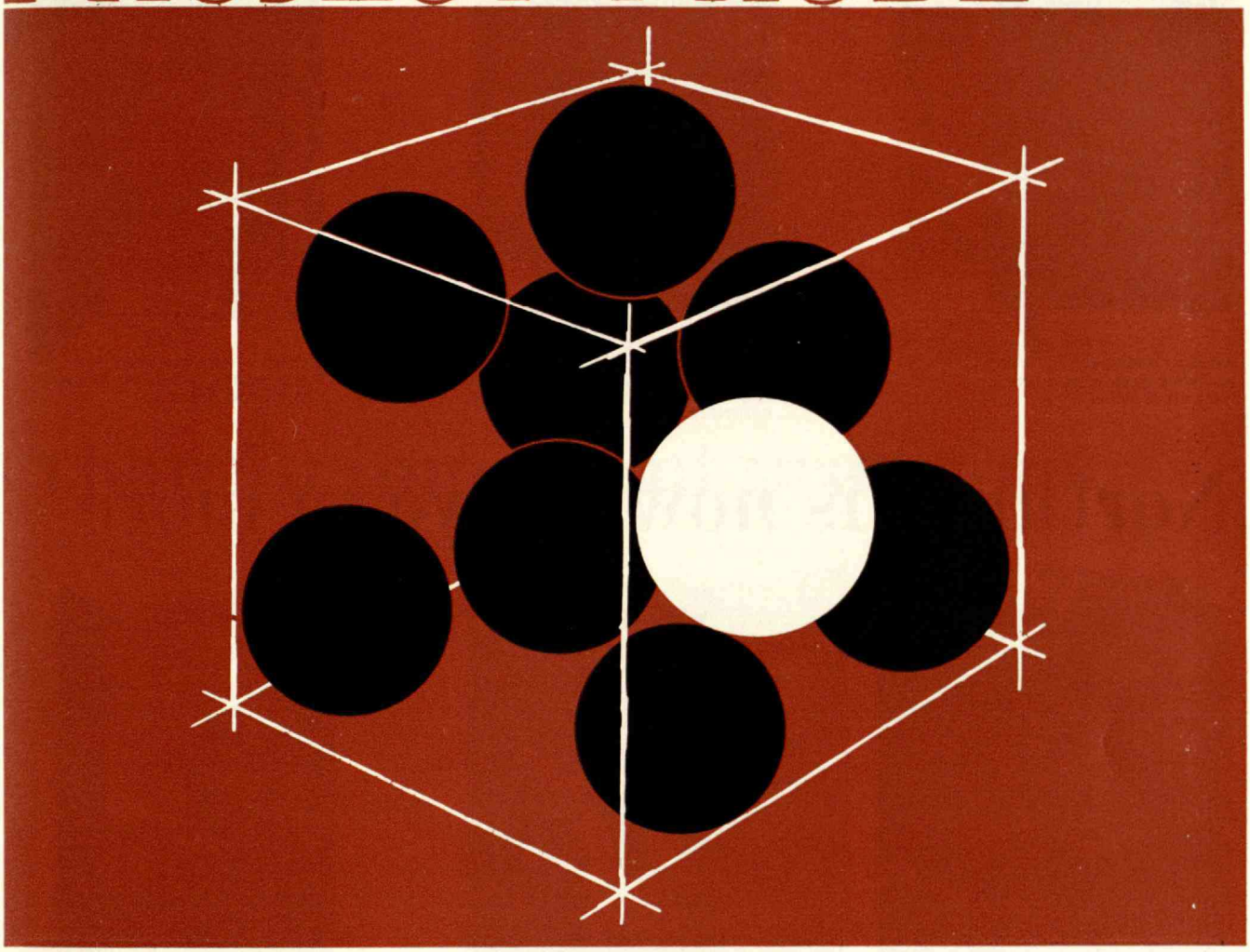
Alumni Day Planners

UPON the recommendation of Albert O. Wilson, Jr., '38, and John L. Danforth, '40, chairman and deputy chairman, respectively, of the 1961 Alumni Day Committee, the following subcommittee chairmen have been appointed: David P. Flood, '45, Luncheon; Edward O. Vetter, '42, Symposium; Wolcott A. Hokanson, Registration; and John L. Danforth, '40, Banquet.

(Continued on page 10)

MELPAR LAUNCHES: PROJECT PROBE

The Parade of Disciplines in the Most Advanced Areas of the ***Physical Sciences***



Today, exploring in all of the physical sciences, Melpar is probing in many areas of fundamental research, such as:

Physical Chemistry, encompassing the relation of physical properties of biological materials to biological functions.

Physical Techniques and Measurements in such fields as electron spin resonance, in conjunction with the studies of molecular structure to determine Zeeman effects on free radicals.

Chemistry Studies in fluorescence, organic reactions, electrochemistry, polymer research, and gas chromatography and radiochemistry.

Why use gas chromatography? Why use electron spin resonance? These represent but a few of the areas Melpar is now exploring. This is Melpar: Project Probe.

Scientists with advanced degrees in any of the Physical Sciences, who are interested in participating in **Melpar: Project Probe,** are invited to write to F. J. Drummond, Professional Placement Manager, Melpar, 3355 Arlington Boulevard, Falls Church, Virginia.

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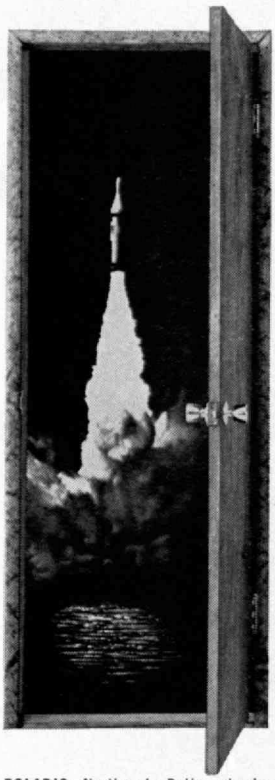
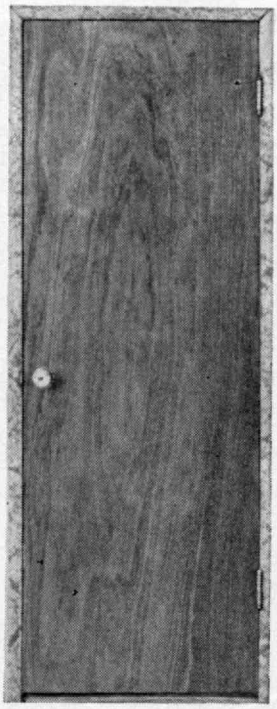
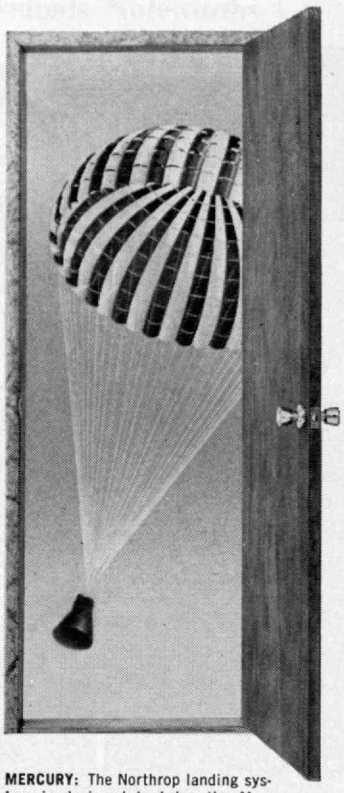


POLARIS: Northrop's Datico checks out Polaris at all levels of maintenance and operation.

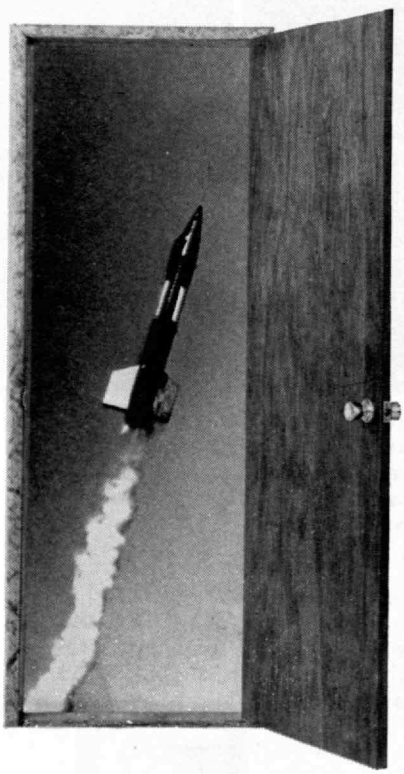


SKYBOLT: Guidance and navigation systems are being developed by Northrop for this new and highly secret air-launched ballistic missile.

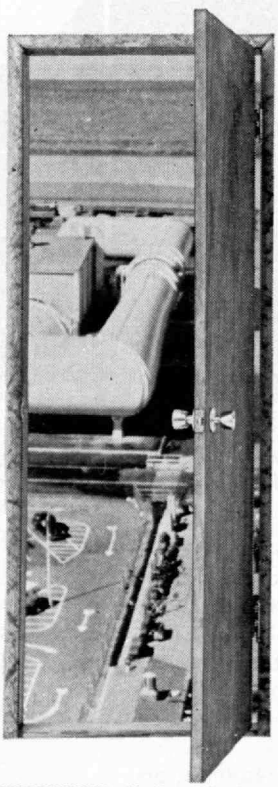


MERCURY: The Northrop landing system is designed to bring the Mercury astronaut down safely.

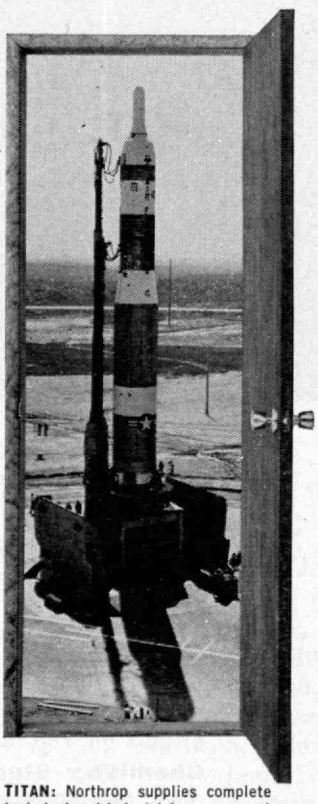
Northrop is now active in more



X-15: Northrop produces Q-Ball, the flight angle sensor for safe re-entry of X-15 and other aerospace vehicles.

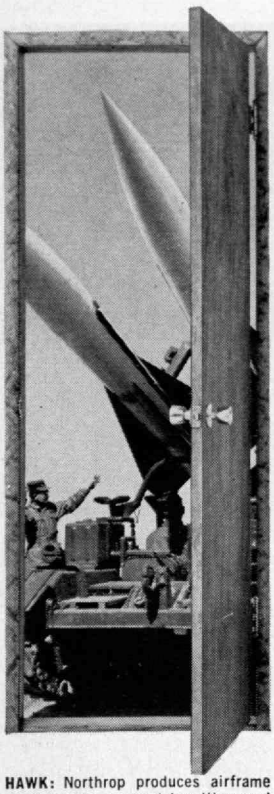


AERODYNAMICS: Northrop's Laminar Flow Control technique is designed to greatly increase aircraft range, flexibility, cargo and passenger capacity.

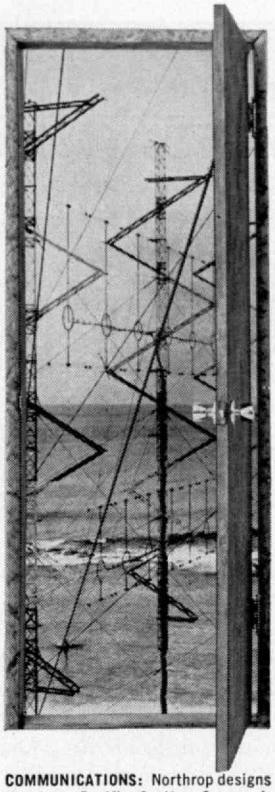


TITAN: Northrop supplies complete technical and industrial management to activate the T-2 Titan missile base.

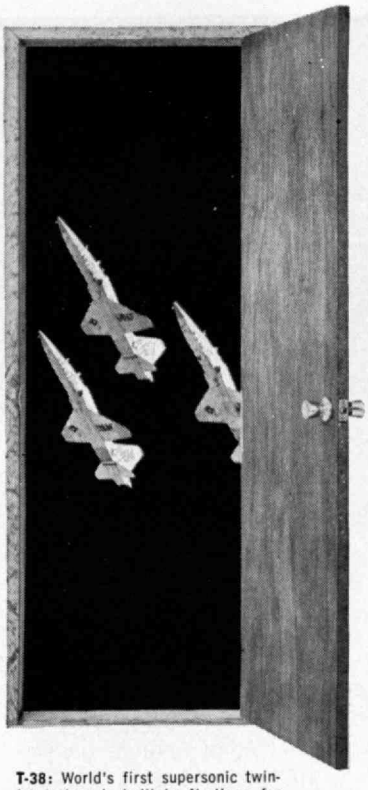
For work on these advanced programs, we seek exceptional engineers, scientists and mathematicians.



HAWK: Northrop produces airframe components, ground handling and launching equipment for this air defense missile.

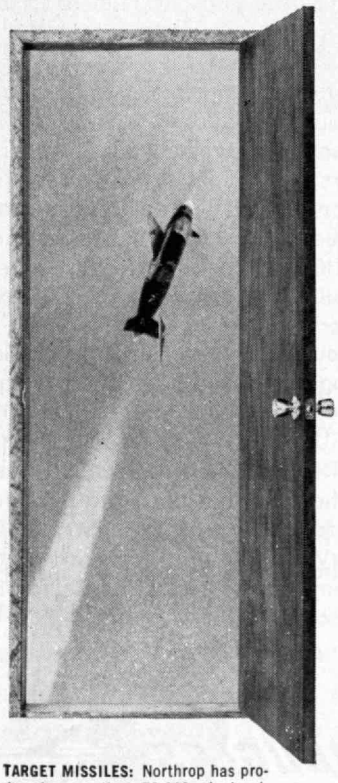


COMMUNICATIONS: Northrop designs the trans-Pacific Scatter Communications Network and other worldwide communication systems for U.S. and free world governments.

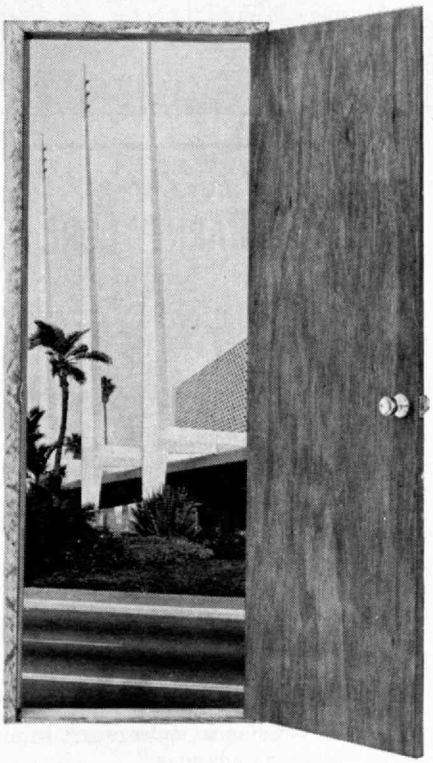


T-38: World's first supersonic twin-jet trainer is built by Northrop for the United States Air Force.

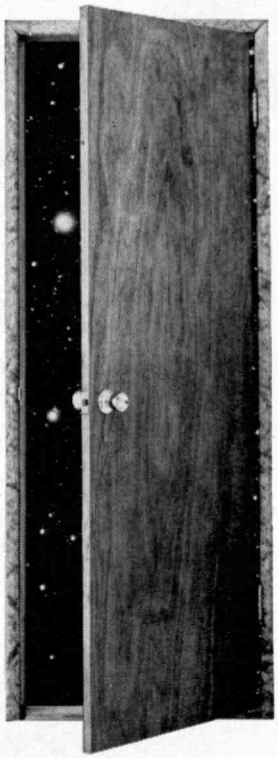
than 70 important programs



TARGET MISSILES: Northrop has produced more than 50,000 electronically-controlled aerial targets, and surveillance drones.



COMMERCIAL METAL PRODUCTS: Northrop produces aluminum architectural shapes for many important industrial and commercial buildings.



SPACE RESEARCH: Northrop's accelerated space research programs reach into such advanced areas as maneuverability, rendezvous, space vehicle maintenance, space probes, and the survival of men in space.

Write Northrop Corporation, Box 1525, Beverly Hills, California. Divisions: Norair, Nortronics, Radioplane.

Individuals Noteworthy

(Continued from page 6)

Honors to Alumni

MEDALISTS and recent recipients of other distinctions include:

Harold S. Osborne, '08, the Thomas A. Edison Medal of the American Institute of Electrical Engineers . . . The Honorable *Thomas C. Desmond, '09,* the grade of Fellow, New York Academy of Science . . . *Kenneth B. White, '20,* designation as *"Chevalier de la Legion d'Honneur,"* "for 30 years of service to French industry," by the French Government;

John E. Burchard, '23, the Distinguished Service Award, by the University of Minnesota . . . *Ernst A. Guillemin, '24,* the Medal of Honor, by the Institute of Radio Engineers . . . *Richard S. Morse, '33,* the Decoration for Distinguished Civilian Service, by the U.S. Army;

Major Carroll E. Adams, Jr., '49, a second Oak Leaf Cluster to the Army Commendation Medal, by the U.S. Army . . . *Douglas W. Fuerstenau, '53,* the Rossiter W. Raymond Memorial Award for 1961, by the American Institute of Mining, Metallurgical, and Petroleum Engineers.

(Concluded on page 42)

. . . a hand in things to come

To bring them back alive

Hurtling toward earth at thousands of miles per hour, a spaceship will have to survive the withering heat of air friction. Today, scientists are applying every known test to conquer the problem of re-entering the atmosphere.

Fortunately, a great deal of this materials testing can be done right on the ground. At Union Carbide laboratories, the fiery zone of re-entry is being duplicated in a wind tunnel with the new plasma arc torch. By squeezing a blazing electric arc and forcing a large volume of gas through it, the plasma arc torch shoots out a 30,000 degree jet—the highest sustained heat ever created by man. This is an example of the many areas in which industry is working to help make space travel a reality.

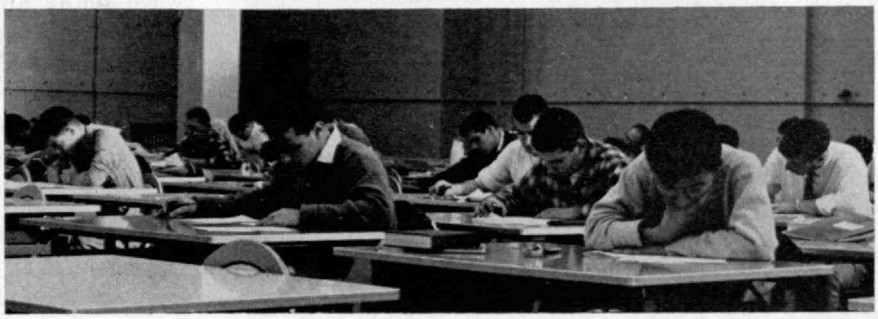
Exploring the unknown is part of the everyday routine for the people of Union Carbide. They are constantly searching for new and better things for the world of today and tomorrow.

Learn about the important work going on now in gases, carbons, chemicals, metals, plastics, and nuclear energy. Write for "The Exciting Universe of Union Carbide" Booklet N, Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. In Canada, Union Carbide Canada Limited, Toronto.

UNION CARBIDE

. . . a hand
in things to come

Trend Of Affairs



The seasonal picture above was taken by Samuel J. Mason, '47, M.I.T. Professor of Electrical Engineering.

President Kennedy's Advisers

Two M.I.T. economists headed groups which reported to John F. Kennedy shortly before his inauguration as President. Paul A. Samuelson, Professor of Economics, reported on the economic outlook for the year, and Max Millikan, Director of the Center for International Studies, reported on a plan for young Americans to work abroad in a peace corps.

The Samuelson report said that proper governmental action could halt the contraction in business in 1961, and called for steps to combat "the basic sluggishness" of the American economy in recent years. Although recommending improvements in unemployment compensation and expenditures on education, health, urban renewal and other programs, the report said a "hastily devised public works program" is not needed, and suggested that a tax cut might be helpful.

The Millikan report indicated that sufficient young men would volunteer to assist underdeveloped countries as members of a peace corps without being offered draft exemption for doing so.

A Property of Our Cave

SINCE Plato's day at least, some men have regarded their environment as a cave. We do live in an electrical cavity bounded by the earth's surface and the ionosphere, and one of this cave's properties was measured for the first time last June. The surveyors were Martin Balser and Charles A. Wagner, '52, of the Radio Physics division of M.I.T.'s Lincoln Laboratory.

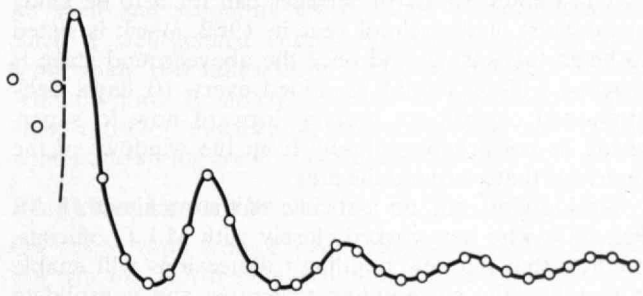
Men have known for some time that radio waves should resonate in the spherical shell between the earth and the ionosphere in the same sort of way that sound waves do in an organ pipe. In 1952 a German scientist calculated that the fundamental frequency of the resonance of the earth-ionosphere cavity would be no higher than 10.6 cycles per second under ideal conditions. The M.I.T. investigators in the field found it to be 7.8 cycles per second.

This is a truly low frequency for radio waves. The frequencies used in ordinary radio broadcasting are measured in millions of cycles per second. Frequencies 100,000 times higher than those in the broadcast band are used now in some advanced radio and radar work and are said to be in the EHF or Extremely High Frequency band. Frequencies 100,000 times lower than those in the medium-frequency broadcasting region can be said appropriately, therefore, to be in the ELF or Extremely Low Frequency band. That is where the resonant frequency of the electrical cavity around the earth was found.

The men who measured it used both one of the first sources of knowledge about electrical phenomena and one of the most modern research tools:

◖ Lightning, which Ben Franklin found helpful, provided the radio waves that the researchers analyzed. Somewhere in the sky it is nearly always generating radio noise in the cavity they were curious about and they made tape recordings of this noise.

◖ A large digital computer enabled them to analyze this noise. It took the place of a narrow-band filter that would have been costly and difficult to build. Lincoln Laboratory previously had used a computer similarly, to simulate operations normally carried out by a radio circuit, when it obtained radar echoes from Venus.



The line pictured above shows the signals the computer found in 10 recordings of lightning's radio noise echoing in the earth-ionosphere cavity. The large peak, at 7.8 cycles per second, marked the fundamental resonance, and is followed by lower ones at the four next higher modes, 14.1, 20.3, 26.4 and 32.5 cycles.

Balser and Wagner had been studying the low end of the radio spectrum for many months before they obtained the data they wanted, and had survived unforeseen hazards. To minimize hum pickup from electrical lines, they once tried working from a 35-foot cruiser in the middle of Boston Harbor, and were nearly run down by the aircraft carrier *Wasp*. They then retreated to the New Hampshire woods, where a game warden suspected them of using electronic apparatus to attract deer illegally and almost took them into custody.

A technical account of their work appeared in the November 19, 1960, issue of *Nature*. The authors have not suggested any uses for the measurement they made, but it is interesting to speculate about what Socrates would ask if he were here to hear about it.

M.I.T. Summer Courses

THE INSTITUTE will offer 26 special summer courses this year. One-week courses will deal with:

Advanced Highway Engineering
Industrial Photoelasticity
Fundamentals of Strain Gage Techniques
Applications of Strain Gage Techniques
Nondestructive Testing
Elements of Textile Structural Mechanics
Advanced Mechanics of Textile Structures
Infrared Spectroscopy: Technique
Infrared Spectroscopy: Applications
Techniques of High-Speed Photography
Radar Astronomy
Technology of Reinforced Plastics
Science of Adhesion
Scientific and Engineering Reports

Two-week courses will be offered in:

Shear Strength Behavior of Cohesive Soils
Experimental Techniques
Engineering Magnetohydrodynamics
Materials Science
The Continuous Glass Making Process
City and Regional Planning
Problems of High-Powered Radar System Design
Dynamics and Control of Chemical Engineering Processes
Fundamentals and Applications of Selected Surface Phenomena
Industrial Dynamics
Planning Marketing Strategy and Tactics
Probabilistic Methods in the Control of Operations

An Upcoming Attraction

PLANS for construction of a 20-story home for the M.I.T. Center for Earth Sciences call for it to be ready at the start of the school year in 1962. Work is slated to begin this spring, and once the aboveground stage is reached a floor should be added every 10 days. Self-appointed experts are looking forward now to supervising its construction closely from the windows of the buildings that surround the area.

Araldo Cossutta, an associate of the architect (I. M. Pei, '40) who has worked closely with M.I.T. officials, predicts that the new building's dimensions will enable it to rally "the surrounding structures and consolidate an otherwise amorphous space." The East Campus, when future low wings complete the composition envisioned by the planners, will be a series of three smaller courts varied in scale and appearance.

"The Earth Sciences tower," says Mr. Cossutta, "is to be the first on the campus. It is expected that there will be others, but the low main buildings and the dome will remain the center of gravity for all of them."

Araldo Cossutta (left) and I. M. Pei, '40, studying the model of M.I.T. as it will appear when a tower is added.

China's Scientific Work

A MAJOR EVENT at this winter's meeting of the American Association for the Advancement of Science was a symposium on "The Sciences in Communist China." Dean George R. Harrison of the M.I.T. School of Science presided and the Institute's libraries helped.

For the 26 participants, M.I.T. librarians collected, copied, and distributed 2,500 issues of Chinese journals from sources all over the world. One especially helpful Chinese-English dictionary published in London in 1912 was found to be out of print but, after an intensive, futile search for it elsewhere, a copy was located in Boston at the Athenaeum.

In addition, M.I.T. libraries prepared the first index of 3,300 papers regarding research in China in 1958 and 1959. This was a 154-page index of "Science Abstracts in China" put out by the Institute of Scientific and Technical Information of China.

This indexing was done in one month with a high-speed digital computer, and was undertaken to provide a pilot model for future indices of Chinese research papers. A system known as the IBM Keyword-in-Context (KWIC) program was used. This system enables a computer to select the key words and list them alphabetically at the same time that it prepares an author index and index code.

Ryburn M. Ross, Associate Director of Libraries, was in charge of the months of work, done under a contract with the National Science Foundation, which preceded the AAAS symposium. The American Chemical Society and other scientific societies helped with the indexing.

"An index to Chinese scientific and technical literature published in English is urgently needed and will become increasingly useful in the coming years," Ross thinks. "Since the inception of the first five-year plan of the Communist Chinese in 1953, the growth of their scientific literature has been phenomenal. No longer can we disregard the need for an adequate bibliographic control of this important segment of the world's scientific literature."

5,000 Stations at Sea

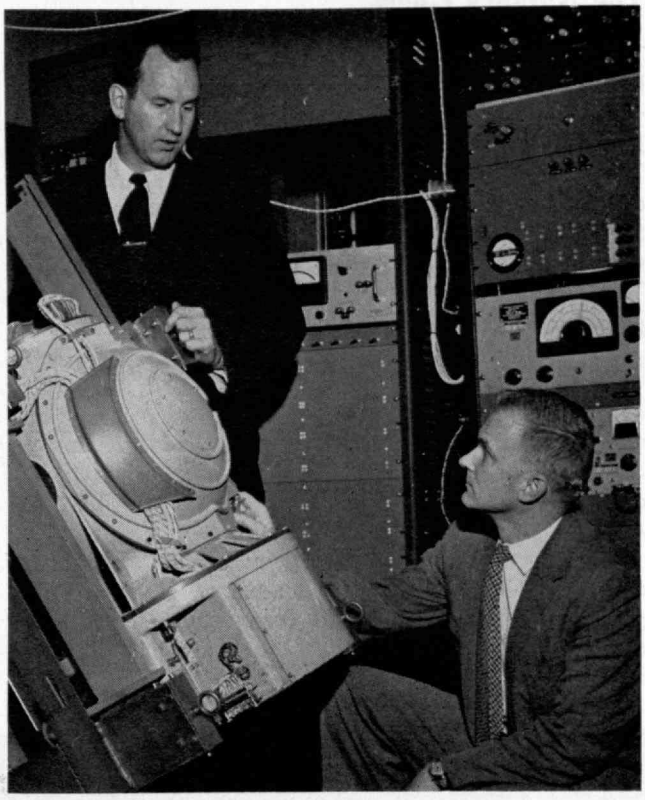
A BASIC OPERATION in oceanography is making a hydrographic "station" by taking the temperature and water samples at various depths from the sea's surface to its floor. This may take several hours. The Woods Hole Oceanographic Institution's *RV Atlantis* made her 5,000th station last November at latitude 18°30′ North and longitude 55°51′ West, and Director Paul M. Fye promptly wired his congratulations to her skipper and crew.

The *Atlantis* made her first station on July 26, 1931, on her first crossing of the Atlantic from Europe. She has since traveled 1,500,000 miles, and made the 5,000th station in the course of an effort to locate the area of maximum salinity in the North Atlantic.

Giving Polaris More Range

THE M.I.T. Instrumentation Laboratory, birthplace of inertial guidance, now is designing an advanced system for the 2,500-mile Polaris missile that the Navy is developing. This new model will be lighter than the one in the 1,200-mile Polaris that is now operational. Reducing the weight will extend the range. The new system also is expected to increase the missile's accuracy.

This laboratory has been the prime contractor under the Navy's Special Projects Office for design and development of Polaris inertial guidance systems ever since the program began. The Polaris unit includes the first digital-type electronic computer ever put into a missile guidance package—a development made possible by advances in miniaturization. The computer controls the missile rocket motors in such a way that it automatically corrects any deviations from the preset course which are sensed by the system's instruments.

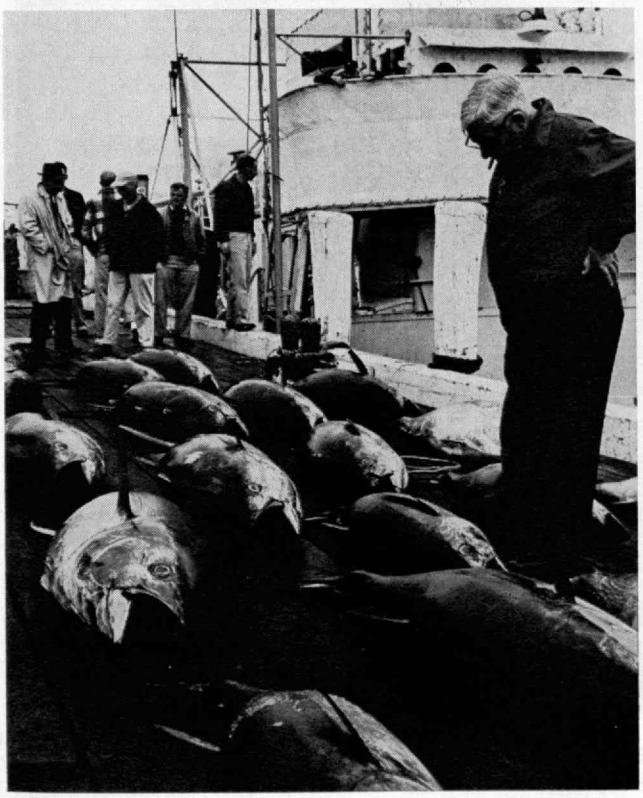


Ralph Ragan, '52 (at left) and David Hoag, '46, with the Mark I guidance system built for the Navy's Polaris missile.

A Spectacular Tuna Catch

THE WOODS HOLE Oceanographic Institution's *R.V. Crawford* caught 25 tons of bluefin tuna on a late November cruise, and at one point got 50 fish for every 100 hooks set out. Frank J. Mather, 3d, '37, was the chief scientist aboard, and the cruise was a continuation of a study of tuna migration he has undertaken.

The *Crawford* set out its lines at 14 stations between Cape Hatteras and the Nova Scotia banks. The lines were from four to seven miles long, supported at intervals by buoys, so that the hooks baited with herring were from 100 to 300 feet below the surface. The biggest catch was at Hydrographer Canyon, east of Hudson Canyon. There, despite heavy seas that made gear-handling difficult, 162 bluefins were boated or tagged and 25 more were lost alongside the ship. Fish that seemed likely to survive were tagged and cut loose.



W. C. Schroeder examining some of the Crawford's tuna.

The strong concentration found, said Mr. Mather, indicated that the fish might be coming off the continental shelf and schooling up for their winter migration. Such a well-defined supply of bluefins only a little more than 100 miles from New England and Middle Atlantic ports, he noted, is certain to interest fishermen since most of the fishing grounds located during the winter and spring are much farther offshore.

Plankton From the Arctic

ON ITS VOYAGE from Portsmouth, N.H., to Pearl Harbor via the North Pole last summer, the nuclear submarine *Seadragon* collected plankton samples under the polar ice. Dr. George D. Grice, marine biologist at the Woods Hole Oceanographic Institution, is examining these samples now, to see if the area where the Atlantic and Pacific populations begin to mix can be determined.

The submarine carried a plankton sampler outside its hull that worked something like a soft-drink dispenser in which a rack of bottles turns to provide one for each customer. The rack in the plankton sampler turned to place a series of tiny nets in the stream of water passing the submarine. These nets were among the smallest ever used, with filter bags only 12 inches long and an opening only three-quarters of an inch in diameter. The battery-operated, self-contained sampler placed a new net in the water every hour for 24 hours, then shut itself off. When the submarine surfaced, the samples were removed and a new set of nets was installed for the next collection.

The *Seadragon* obtained 204 samples near and under the Arctic ice with this device.

The Nation's Goals

TWO MEMBERS of the M.I.T. Corporation, James R. Killian, Jr., '26, its chairman, and Crawford H. Greenewalt, '22, a life member, served on the Commission on National Goals appointed by President Eisenhower. This commission's report, published early this winter, emphasized that "the paramount goal" of the United States is "to guard the rights of the individual, to ensure his development and to enlarge his opportunity." The report then went on to discuss many ways of approaching and realizing this objective more fully.

Regarding education, the report said in part:

The development of the individual and the nation demands that education at every level and in every discipline be strengthened and its effectiveness enhanced. New teaching techniques must continue to be developed. The increase in population and the growing complexity of the world add urgency.

Greater resources—private, corporate, municipal, state and Federal—must be mobilized. A higher proportion of the gross national product must be devoted to educational purposes. This is at once an investment in the individual, in the democratic process, in the growth of the economy, and in the stature of the United States.

And in a section devoted to the arts and sciences the report said in part:

Knowledge and innovation must be advanced on every front. In science we should allot a greater proportion of our total effort to basic research, first, to realize fully the rapidly unfolding opportunities to extend still further our understanding of the world, and second, to enrich applied science and technology so essential to the improvement of health, to economic growth, and to military power.

Today we must give high priority to those aspects of science and technology which will increase our military strength, but for the longer term we should recognize that our creative activities in science and all other fields will be more productive and meaningful if undertaken, not merely to be ahead of some other nation, but to be worthy of ourselves.

We should insure that every young person with the desire and capacity to become a scientist has access to the best science education our leading scholars can devise. Given the availability of such education, science will find its fair share of the pool of talent.

M.I.T.'s Jerome B. Wiesner, whom President Kennedy chose as his Special Assistant for Science and Technology, was photographed with Mrs. Franklin D. Roosevelt and his daughter during the tape recording of a recent educational TV program. Professor Wiesner will fill the national post first held by James R. Killian, Jr., '26.

(Trend of Affairs is concluded on page 36)

11 Ways to Help Make Science A Vital Force in Foreign Policy

Exploitation of its potential as an intellectual adventure will appeal to all men's finest hopes

BY JAMES R. KILLIAN, JR., '26

THIS ARTICLE was drawn from the address that the Chairman of the M.I.T. Corporation gave December 14 at the Silver Stein Dinner of the M.I.T. Club of New York. Dr. Killian has spoken similarly at other recent meetings of the Alumni, and has conducted a seminar at the Institute this year on Scientific Development and Government Policy which deals with the problems that now confront both scientists and governmental policy-makers.

SINCE World War II the status-seekers in the community of nations have relied increasingly on science and technology to build their prestige. The Soviets especially have used technology as an instrument of propaganda and power politics, as illustrated by their great and successful efforts—and careful political timing—in space exploration. They have sought constantly to present spectacular accomplishments in space technology as an index of national strength, and too often the press and the public at large have interpreted these spectacular exploits as indices of strength.

Spectacular accomplishments in space technology *have* enhanced the prestige of the Soviet Union, and we can all admire their achievements. But their expensive emphasis on space exploration will not be enough in the long pull to sustain an image of strength. This will only be accomplished by a balanced effort in science and technology. True strength and lasting prestige will come from the richness, variety, and depth of a nation's total program and from an outpouring of great discoveries and creative accomplishments on a wide front by its scientists and engineers.

In space exploration, as in all other fields that we choose to go into, we must never be content to be second best, but this does not require us to engage in a prestige race with the Soviets. We should pursue our own objectives in space science and exploration and not let the Soviets choose them for us by our copying what they do. We should insist on a space program that is in balance with our other vital endeavors in science and technology and that does not rob them because they currently are less spectacular. In the long run, we can weaken our science and technology and lower our international prestige by frantically indulging in unnecessary competition and prestige-motivated projects. So far our space program has been well planned and remarkably successful; by concentrating on scientific discovery and on such practical technological objectives as improved weather forecasting and communications, we have exploited our own special genius and proceeded in the great tradition of American science and technology.

Today, however, the pressures are very great to engage in an item-by-item race with the Soviets. Our man-in-space program is the principal victim of these pressures and it is certain to present some difficult policy questions in the near future. Many thoughtful citizens are convinced that the really exciting discoveries in space can be realized better by instruments than by man.

Unless decisions result in containing our development of man-in-space systems and big rocket boosters, we will soon have committed ourselves to a multibillion dollar space program. I have never seen any public statement estimating the costs of the successive generations of big boosters for man in space or for the other parts of the program. How many billions of dollars will they cost over the next decade or more? How much is it likely to cost to orbit a man about the earth, to achieve a manned circumnavigation of the moon, or a lunar landing? The public should have some feel for the magnitudes involved. However much they may cost, we may decide we must spend the money but we should make this decision with a clear understanding of the startling costs entailed. We should not permit ourselves to slide unwittingly past a point of no return. I do not oppose a man-in-space program. I ask that we give the public a better opportunity to understand and to debate the rate at which we proceed.

The American people must seek to determine whether we are now proceeding too rapidly and whether we can manage the present program without weakening other important national programs, including defense. They must face up to the tough decision as to whether we can justify billions of dollars for man in space when our educational system is so inadequately supported—whether our system of values assigns greater importance to this kind of exploratory activity or to

the development of intellectual quality. Will several billion dollars a year additional for enhancing the quality of education not do more for the future of the United States and its position in the world than several billion dollars a year additional for man in space? The image of America may be shaped by the quality of its inner life more than by its exploits in outer space.

Many may not agree with these attitudes toward space, but I express them to point up the issues of policy involved in the use of science for international prestige.

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Let me next discuss the great importance of voluntary international co-operation in science, and let me start by recounting a specific policy question that came before our Department of State two years ago. Should the United States support a United Nations space research program?

Despite their advocacy of international co-operation in space research, many informed American scientists felt it would be undesirable for the United Nations Committee on the Peaceful Uses of Outer Space to undertake space research and exploration and they strongly urged that we not support a charter for the committee that would call for this kind of operational responsibility at this time. They were led to this position by the great success of the International Geophysical Year, which was conducted not by a political body such as the United Nations, but by a private, nonpolitical, nongovernment organization, the International Congress of Scientific Unions. The conviction was strongly held that international co-operation in space research and exploration could best be encouraged and co-ordinated by the Space Committee (COSPAR) of this volunteer private federation. This position prevailed in the United Nations, and its Committee on the Peaceful Uses of Outer Space was limited in its responsibility to the study of the regulatory and legal aspects of space, the exchange and dissemination of information on outer space, and the encouragement of space science.

So far this seems to have been a wise position. COSPAR does not have to face political issues and as a result, its scientist members, including the representatives of the Soviet Union, have come together in the context of a true scientific conference to reach agreements—without much more display of differences than can be expected in international scientific meetings.

Political scientists may well question—and some have—the desirability of thus by-passing an international political organization in furthering international co-operation. Is it not going to be ultimately necessary, they ask, to learn how to make the political organization effective in such matters? This is a legitimate question, but so far the scientists are supported by the unmistakable evidence that international groups of scientists seem able to achieve co-operation of great importance when they are free of political entanglements and can act freely with the tropism toward co-operation which is traditional among scientists. So far the U.N. Committee has been boycotted by the Soviets, who have raised questions of parity in East-West membership and who have insisted on a Russian being chairman.

The concepts and laws of science cross all national and ideological boundaries. It is the one language understood the world around. It is a means to common understanding and joint action. In response to these benign characteristics of science, we have seen successful patterns of co-operation between nations with deep ideological differences. I have already cited the example of the International Geophysical Year. In a similar fashion scientists from a number of countries are shaping a plan for a co-ordinated oceanographic study of the Indian Ocean, and a plan is afoot for a global resurvey of the earth's magnetic field. There is today discussion in Europe about a joint space program participated in by the nations in that area, through a combined effort that would not be unlike what has made CERN (The European Organization for Nuclear Research) so impressive an achievement.

It has fortunately been American policy to encourage such voluntary activities. As a result we see today a great complex of international relationships and communities which stand apart from the political relationships between governments and which are not restricted by the formal channels between nations. They represent hopeful anti-tension elements in the present cold war. In the recent Antarctica Treaty we have seen an extremely important precedent and achievement. As a result of this 12-nation treaty territorial claims are not pressed in Antarctica; there is free access to all parts of the area, thus providing a truly international laboratory for scientific work, and the participating nations have provided for a true and inspectable demilitarized zone. I.G.Y. made a major contribution to the creation of this concept of an international laboratory area and to the realization of a major diplomatic advance in peaceful co-operation among nations. As President Eisenhower has suggested, the Antarctica Treaty may also be a prototype for a treaty establishing the peaceful use of outer space.

The professional discourse among Soviet and American scientists, now fortunately extended beyond the domain of atomic science, is a dialogue of hope in the tense pessimism of the cold war. It should be encouraged by both nations, as should the whole array of cultural relations.

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Another example of the importance of science in foreign relations is provided by the large program of the United States for providing technical assistance to underdeveloped nations and in sponsoring research abroad. Our technical aid programs have accomplished much but they require constant review and improvement if they are to serve the top-priority needs of the countries they seek to help. The chief hazard lies in the tendency to think that the sophisticated technology we find good for the United States is also good for a country which is in an early stage of technological development. I cite, as an example of what not to do, the nuclear research reactors we have given to certain countries where reactors have little, if any, relevance to national needs and where they have no real use except to serve dubiously as prestige installations. Actually, much of our technology is useful to these countries provided we match it to their needs.

We have seen an extremely important precedent set in the Antarctic Treaty which provides for free access to the area.

Mr. James Smith, when he headed the International Cooperation Administration, was acutely mindful of this problem, and as a result of his initiative, the President's Science Advisory Committee sponsored a study group of the National Academy of Sciences to look in detail at the needs of a specific area. Its report, "Recommendations for Strengthening Science and Technology in Selected Areas South of the Sahara," is, in the words of Dr. George Kistiakowsky, "an intelligent and realistic attempt to strike the necessary balance between the basic needs and sophisticated wants. It is also an attempt, a very successful one . . . to show how a scientific approach can be used in the early planning stages of aid programs." We need more of this kind of searching study of technical aid.

We also need more international action to promote and better technical aid. Fortunately, the United Nations Science Committee is exploring the possibility for a great international conference on the use of science and technology to help underdeveloped countries.

The kind and level of education in less-favored nations is importantly related to the problem of technical aid. It is my observation as an educator that the educational systems of many of these underdeveloped countries we wish to help are all too frequently ill-adjusted to their needs. To cite one example, one finds a great emphasis on the education of lawyers, in country after country, and a great prestige attached to the legal profession, when the law graduates face the almost certain prospect that their profession will be overcrowded and where the country clearly needs not more lawyers but more government administrators, technicians, engineers, nurses, physicians, elementary school teachers, and skilled laborers.

Too many countries take Oxford and Cambridge or Harvard or M.I.T. or Caltech as the principal models for their institutions of higher learning, when their most immediate needs would be better met by institutions similar to our land grant colleges, teachers' colleges, and technical institutes and by an educational philosophy which honors and supports the "social utility of all useful labor." Our technical aid programs should assist these countries in creating institutions of high standards and in which they can take great pride, but they should not ignore the great importance of encouraging practical education. We should encourage those values which support utilitarian education along with the higher reaches of humanistic learning.

Not only do we have technical aid programs abroad involving large expenditures; we also have multiplying research programs. The military services, for example, are supporting basic research in Europe and in some of its universities and they have sponsored and established laboratories abroad. The Department of Agriculture and the Institutes of Health are also sponsors of research in foreign countries. Before it adjourned for the political conventions, Congress passed and the President signed, a "Health for Peace" Act, which authorizes the President and the Public Health Service to make grants to foreign scientists and institutions. There has been discussion of a similar "Science for Peace" Act to implement the President's 1958 proposal for an international science-for-peace program.

These are all worthy aims, and in general, the funds we have spent abroad for research have served to strengthen Free World science and to advance science. The fact remains that we need better co-ordination of these foreign activities. Recently six different agencies of our government were all seeking independently to establish offices in one country to deal with some aspect of science and technology.

In general these extension activities, even when unco-ordinated in Washington, have been welcomed by foreign countries, but not always. Naturally some foreign universities feel uncomfortable or reluctant in accepting research funds from U.S. military organizations. There is always the hazard that our grants may unwittingly distort the research pattern of recipient countries, or that these countries will come to depend upon U.S. funds for their scientific strength and will be hurt or unhappy if these funds are withdrawn. Sometimes the host country is puzzled, if not troubled, by multiple, unco-ordinated efforts.

All these considerations require wise and careful management in Washington, and I am glad that recent attention has been focused on our far-flung network of research and scientific activities abroad. There is also the need to insure that our embassies have the means

and opportunity to co-ordinate our programs locally and here it is fortunate that we have scientific attachés and that they are being used increasingly to advise our ambassadors. But the post of Science Adviser to the Secretary of State needs to be given more scope than it so far has had, and the system of scientific attachés must be maintained and kept manned with able men if our national interests are to be well served. We should also continue to encourage NATO to continue its science advisory committee and the Science Adviser to its Secretary General. Both have contributed to the strengthening of science in the Atlantic Community.

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If we are to deal wisely with the application of science to foreign affairs, we must have more scientists in government and more foreign service officers with scientific or engineering education. Especially is it important for the scientific community to recognize and give dignity to these new functions. Many scientists disdain public service as an activity which is the resort only of those who cannot make the grade as practicing scientists. Some scientists, however gifted as scientists, are wholly unfit for administrative policy making and other public responsibilities. Still others, even though qualified, obviously should not interrupt their creative work, where their contribution is unique, to accept the diversionary role of administrator or adviser. While recognizing the unwisdom of pressuring these categories of scientists into the public service, we must nevertheless emphasize the urgent need for more scientists who have a deep understanding of science but who have in addition the cast of mind, the motivation, and the breadth of understanding to serve effectively in policy-making, advisory, and administrative roles. The profession of science should be broad enough to give honorable estate to men of this combination of abilities; and our institutions, public and private, and especially government, which have large scientific responsibilities, must devise ways to insure inviting careers for science administrators. These scientist-administrators should be available for more than *ad hoc* advisory service. Increasing numbers of them are needed for sustained full-time activity, including careers in the public service. Especially do we need more career men of this kind in the Foreign Service.

Much will be gained if our universities provide better academic opportunities for scientists to prepare themselves through education and orientation for this increasingly important role.

And now in summary let me present an 11-point program for enhancing the contributions of science and engineering to the formulation of sound foreign policy and to Free World strength:

1) Recognize and stress the contributions which science can make to peace and encourage scientific activities abroad—as, for example, the betterment of health, the improvement of agriculture, and basic research—which are manifestly peaceful and benign.

2) Encourage more of the I.G.Y. type of programs which are managed by nonpolitical, private scientific organizations.

3) Encourage more international conferences such as the Conference on the Peaceful Uses of Atomic Energy. Specifically support the proposed U.N. Conferences on the Peaceful Uses of Outer Space and on Technical Aid.

4) Despite aggravations and difficulties, continue to encourage exchange of scientific personnel between East and West. Reduce petty restrictions on scientists invited to the United States.

5) Undertake periodically a thorough review of our technical aid policies and programs to insure that they are well adapted to the countries they are intended to help. Seek the advice of knowledgeable scientists and engineers in conducting these reviews and strive for programs which bring the benefits of science in all its phases to less-favored countries.

6) Provide in Washington a mechanism for co-ordinating research programs and other scientific activities which government agencies sponsor abroad and make sure that our ambassadors have the opportunity, in each country where such work is conducted, to co-ordinate it locally.

7) Widen the role of the Science Adviser to the Secretary of State and continue to build strength in the corps of science attachés. Give this Science Adviser a role to play in strengthening the competence of the State Department to deal with the technical aspects of arms limitation. Support the continuation of NATO's science advisory services.

8) Encourage regional programs to strengthen science not only in Europe but in other parts of the world. Science lends itself well to international efforts. CERN is an example.

9) Encourage international efforts to develop more engineer-managers or project engineers who can direct the successful development of intricate engineering systems, who can deal with new orders of reliability, who can bring wisdom and social foresight to the difficult task of handling technological change so that it benefits and does not hurt people and who can mobilize technology with this in mind to increase productivity.

10) Do not misuse science and technology by distorting them for propaganda purposes. We will build greater prestige in the long run by insuring the quality, vigor, and integrity of our science and technology. We gain prestige by being better in more areas.

11) Encourage more scientists and engineers to prepare themselves for foreign service and for advisory and administrative responsibilities in government. Encourage universities to establish programs to educate scientists having this orientation.

These are a few of the ways in which science can serve our national goals in foreign affairs. The best way for science to serve these goals is to be vigorous and superior in all its work. If we can maintain our leadership in science, we will have a great resource for national leadership.

Outstanding accomplishments in pure science for purposes of understanding as well as application can bring our society poise and strength as well as prestige and acclaim among mankind—as a nation that demonstrates the capacity of science to enhance man's understanding and thus each man's dignity. The nation which embraces this vision of exploiting the full potential of science as a noble intellectual adventure will appeal widely and deeply to the best hopes and aspirations of man.

The Molecules And Cells of Living Things

Research in the life sciences at many levels benefits from collaboration between Institute biologists and scholars in other disciplines

By Irwin W. Sizer

Professor of Biochemistry at M.I.T. and Head of the Department of Biology

At M.I.T. research in the life sciences is blossoming in many different places. Investigations of problems at numerous levels, from those posed by a single molecule within a virus particle up to those of the complex nervous system of man, have gathered strength here from the physical sciences and engineering. The butterfly net, the scalpel and forceps have been displaced by chromatography equipment, the amino acid analyzer, the ultracentrifuge, the cathode-ray oscilloscope, the electron microscope, the x-ray machine, the radioactivity counter, and the atomic reactor.

No single scientist can master all of the complex modern methods of investigating living matter. A team approach has become customary, and the sharing of methodology, and cross-fertilization of ideas, are resulting in remarkable progress toward an understanding of some of the phenomena of life.

At the Institute, the Department of Biology is responsible for the undergraduate curriculum in the life sciences, and also has a training program for graduate and postdoctoral students of biophysics, biochemistry, microbiology, physiology, and cellular biology. The research interests of its Faculty span a broad spectrum,

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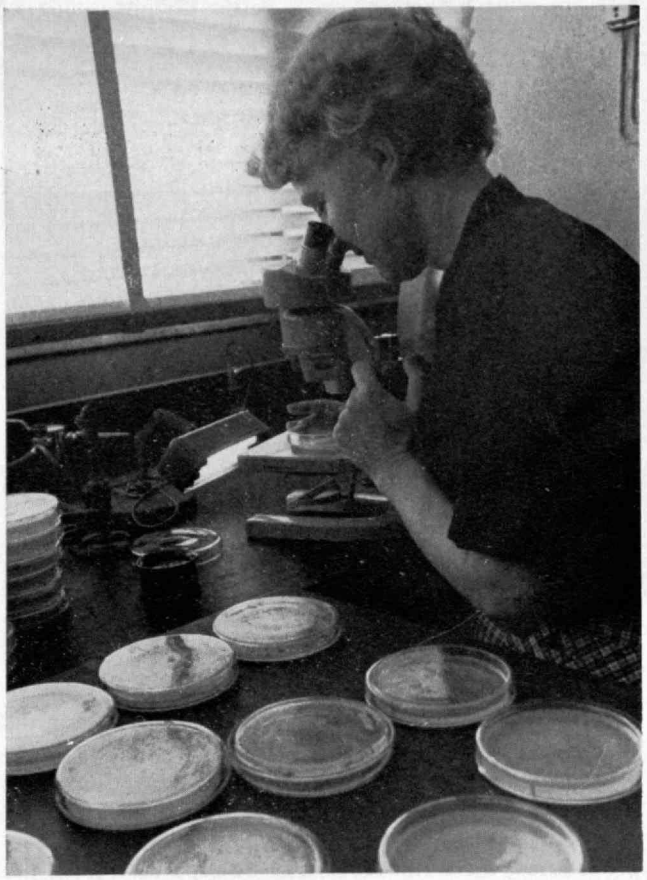
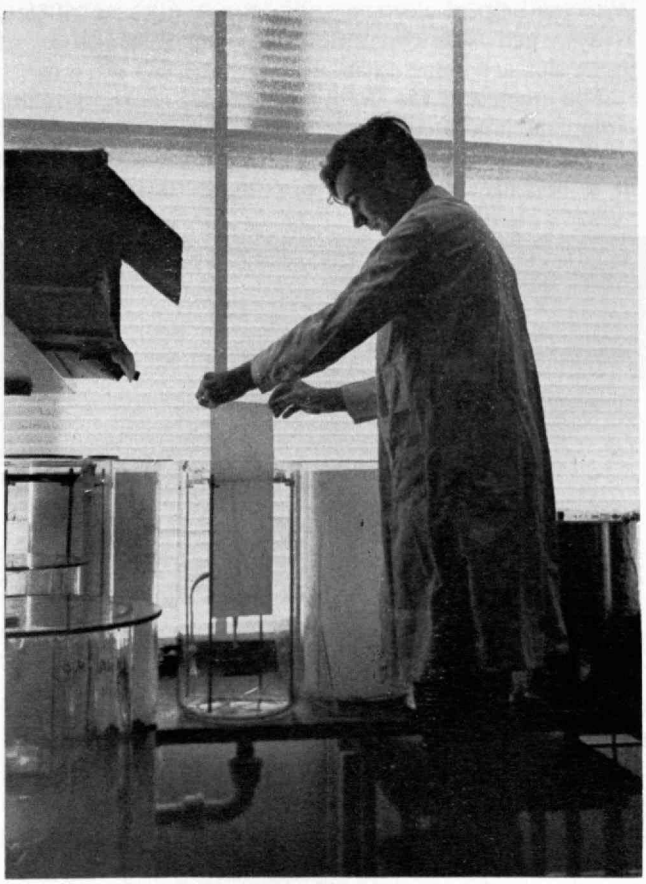
This Article *refers to research in which the following M.I.T. professors are engaged: Eugene Bell, Gene M. Brown, John M. Buchanan, James E. Darnell, Jr., John R. S. Fincham, Bernard S. Gould, '32, Cecil E. Hall, '48, Edward Herbert, Vernon M. Ingram, Jerome Y. Lettvin, '47, Cyrus Levinthal, Herman W. Lewis, Kurt S. Lion, Salvador E. Luria, Boris Magasanik, Alexander Rich, Phillips W. Robbins, Francis O. Schmitt, Irwin W. Sizer, Patrick D. Wall, and David F. Waugh.*



Dr. Dorothy K. Fraser, research associate, examines the growth of bacteria in petri dishes as part of her research.



Anthony O. W. Stretton, instructor in biology, is one of many researchers who find paper chromatography helpful.

but are always focused on a better understanding of living organisms.

For several years certain aspects of molecular biology have been especially emphasized. Studies at the cellular level, including the interactions between cells, now are gaining in importance. In all cases, biological research at M.I.T. benefits from the help it receives from mathematics, physics, and chemistry, as well as applied fields of engineering and medicine.

Although likely to be found under way almost anywhere, biological research at the Institute is most concentrated in the Communications Center and the Center for Life Sciences. These centers have grown rapidly and the Second Century Program provides for them to be doubled in size. Other research groups, including the new Laboratory for Experimental Psychology, will co-operate with them increasingly. M.I.T., in its centennial year, appears destined to become one of the world's leading institutions for biological research. This, therefore, is an appropriate time to survey some of the many different problems with which its Faculty and research staff are deeply concerned.

Biophysics

The biophysics group is studying the ultrastructure of the living cell. Many of its members are especially interested in the study of the giant molecules of protein and nucleic acid which play a vital role in catalysis, growth, and reproduction. By elaborate physical and chemical procedures, these molecules can be separated from the cell and so purified that their size, shape, hydration, electrical charge, optical polarity, absorption spectrum, and crystallographic structure can be studied. With the help of electron microscopes, ultracentrifuges, x-rays, and spectroscopes, many different kinds of molecules are being examined.

The nucleic acids are being studied now in many biological laboratories. They are found to exist as extremely long, double threads, coiled around each other in a helical array. These are highly unstable molecules, easily fragmented by shearing forces. But large synthetic molecules, which resemble the natural DNA and RNA, can be built; and it is possible now to investigate the role of the nucleic acids in cell division, their self-replication, and the manner in which they store the information that the cell needs to make specific proteins.*

Dr. Jerome Lettvin, '47 (left), tells Walter Pitts of the Communication Center what the frog's eye tells its brain.

Mixed polymers with a fiber of RNA and one of DNA entwined in the helix are especially interesting. In the case of the smallest virus ever isolated and studied with the electron microscope, the bacteriophage Phi X-174, the surface shell of protein apparently is arranged as a dodecahedron, and the core of the virus contains single-stranded DNA. Once the virus has penetrated into a bacterium this DNA duplicates itself and directs the biosynthesis of virus protein from amino acids of the bacterium.

Equally exciting are studies of the function of the nucleic acids in the genes which control hereditary traits. In the case of the bacterium *E. coli,* a gene is the architect in charge of the production of phosphatase, the enzyme that breaks down organic phosphate compounds. When this gene undergoes 150 or more mutations, the phosphatase produced by the cell is correspondingly altered with reference to its physical, chemical, and enzymatic sites. The enzyme has been crystallized and shown to have a molecular weight of 80,000 and to contain the trace metal zinc. This enzyme produces inorganic phosphate from organic phosphate but, by means of a molecular feed-back mechanism, the inorganic phosphate prevents the cell from producing more phosphatase. A mutant cell which lacks this control mechanism has been isolated. Studies in progress are directed toward the interpretation of the coding system of the DNA in terms of the amino acid sequences in the enzyme whose synthesis the DNA determines.

Among the proteins being investigated are those of the blood-clotting and milk-coagulation systems. In blood, a molecule of fibrinogen is found to consist of three tiny beads on a "string." When the enzyme thrombin brings about clotting, molecules of fibrinogen join end-to-end to form long fibers of fibrin, the major component of the clot. In a somewhat similar fashion, milk is clotted to curds and whey by the enzyme rennin ("junket"), which partially digests the kappa-casein of the milk. The over-all clotting reactions of blood and milk, as well as the checks and balances built into the mammalian feed-back control systems, are receiving detailed attention.

In the field of immunology new evidence has been obtained regarding the interaction between protein antibodies in the blood and foreign antigens which enter the body. Electron microscope photographs show that antigen causes rod-shaped rabbit antibodies to precipitate by joining end-to-end.

The connective tissue protein, collagen, is one of the most studied macromolecules at M.I.T. We know now that it consists of cross-striated fibers which can be dispersed in certain solvents and then reaggregated into characteristic forms. This reconstitution depends on the presence, at the ends of the molecule, of certain

*See "From Hydrogen to Man," The Technology Review (Jan., 1960, p. 12).

peptides which can be split off by the enzyme trypsin. The role of collagen in the mineralization of bone and in the healing of wounds is under extensive study, which should lead to new knowledge of the growth of the skeleton and the process of tissue repair.

Biochemistry

The biochemists, preoccupied with the chemical events that occur in living organisms, take satisfaction in isolating and purifying enzyme systems from the cell and duplicating in the test tube reactions that are essential to life. Special attention is devoted to investigations of biosynthesis and intermediary metabolism, and the isolation and characterization of the enzymes which catalyze the reactions of living organisms.

The biochemistry of vitamins is another one of the major interests of M.I.T. biochemists. How microorganisms put trace nutrients together, piece by piece, has been studied in the case of the B vitamins, pantothenic acid, nicotinic acid, thiamin, and folic acid. The manner in which these trace nutrients function in the living cell (as coenzymes required in addition to protein for enzymatic activity) is a key problem in biology. Folic acid has been shown to play a vital role in purine and nucleotide biosynthesis, but this function can be blocked by antimetabolites such as azaserine, a drug now being studied for use in cancer chemotherapy. Similarly, pyridoxine is an essential component of transaminase, an enzyme that is involved in amino acid metabolism. This enzyme is inhibited by the action of the antitubercular drug isoniazid on its vitamin group. The coenzyme function of vitamins B_1, B_2, B_6, and B_{12} in cellular oxidation is being elucidated with reference to the active catalytic sites on the enzyme molecules. Vitamin C (ascorbic acid) appears to be required for the formation of collagen in the body; its crucial role in laying down granulation tissue during wound healing in scorbutic guinea pigs is being studied.

Disease is undergoing investigation at the molecular level in human beings who suffer from anemia and other diseases caused by abnormal hemoglobin in the blood. To date, some 25 abnormal hemoglobins have been identified and have been shown to result from a simple Mendelian type of inheritance of a mutant gene responsible for abnormal hemoglobin biosynthesis. To determine the defect in the molecule, it has been degraded with enzymes, and the resulting peptides have been "finger-printed" by modern techniques.

By such analyses it has been possible to demonstrate that in the hemoglobin of sickle-cell anemia the glutamic acid of normal hemoglobin has been replaced by valine. Comparable substitutions of single amino acids occur in other abnormal hemoglobins. From chemical and human genetics studies it is apparent that different parts of the hemoglobin gene in the chromosome are responsible for different amino acid groups in the hemoglobin molecule of the red blood cell. Other rapidly accumulating evidence indicates that a mutation of the DNA molecule in the gene can result in a substitution of one amino acid for another during biosynthesis of an enzyme protein controlled by that gene.

Physiology and Cell Biology

The physiology group is concentrating its attention on the sense organs and nervous system in an attempt to understand the interrelationships among cells and the manner in which information is transmitted from one part of the body and stored in another. Much of this group's work is being done in collaboration with other scientists in the Communications Center. The cell biologists are interested in the problem of growth, development, and cell duplication at the molecular and higher levels, with special reference to the role played by the nucleic acids.

Leonard Keay, a research assistant in the Department of Biology, is shown measuring metabolism in enzyme systems.

In order to study the interplay of cells in the whole organism during growth and development, the embryologists have been using irradiation with ultra-sound (which removes the surface coat). It has been demonstrated that the mesoderm rather than the ectoderm is of prime importance in the formation of the limb buds of the tadpole and chick embryo.

A tissue culture method which involves growing cells in a diffusion chamber imbedded in the chorioallantoic membrane of the chick embryo is yielding new information about growth and development. In such a chamber, mammalian cells can multiply and differentiate and behave in characteristic ways; e.g., human leucocytes produce antibodies, and nerve cells conduct impulses.

In the field of genetics, interest is centered on the mechanism by which genes control enzymes. Mutations affecting different strains of bacteria, molds, or fruit flies often result in a variation in the amount and general properties of a particular enzyme produced. In addition, certain modifiers and inhibitors of enzymes may be under genetic control.

Cell biologists are studying the biosynthesis of proteins in the cytoplasm under the control of RNA. It appears that each amino acid is activated by uniting with a nucleotide, which in turn is attached to the end of a specific soluble RNA fiber like a tail to a kite. The amino acids in this form are then assembled in an orderly sequence to make up the polypeptide chain of the specific protein. A consideration of the role of RNA in the synthesis of hemoglobin in the reticulocyte of the

(Concluded on page 44)

Writing a Western Reveals A Computer's Lack of Tact

Must computers be rude to people? Can't they be made more patient and personable?

THE QUESTION arose when an M.I.T. computer wrote a scene for a TV western. The TX-O which thus demonstrated its versatility is a fast, up-to-date, transistorized machine, but its programmers reported in a recent Electronic Systems Laboratory seminar that it had behaved like a very small child determined to appear stupid and stubborn.

It took two experts, Douglas T. Ross, '54, and Harrison R. "Dit" Morse, '59, two months to get the computer to write a two-minute scene. The machine then turned out scores of scripts, a couple of which were used as part of a CBS *Tomorrow* telecast occasioned by M.I.T.'s centennial.

Having the TX-O do the writing was the TV producer's idea, and its operators undertook this unusual academic venture in the hope of showing people that:

1) Intelligent behavior is behavior according to rules;

2) A computer can do some things that some people consider creative, but

3) There is no black magic about the way these electronic devices work.

For a human playwright, the computer's assignment would have been simple. There were to be only two characters, a sheriff and a robber; only one set, the robber's hide-out; and only a few props, the robber's loot, a table, a chair, a barrel, a bottle, a glass—and, of course, guns. The scene had to be climaxed by a shoot-it-out. Thus the plot, in effect, was outlined—but its details had to be decided by the computer.

No dialogue was demanded. The script consisted wholly of directions for the actors, such as:

SHERIFF:
open door
see robber
go thru door
go to window
go to table
aim
fire
ROBBER NICKED

ROBBER:
see sheriff
aim
fire
MISSED
go to table
aim
fire
MISSED
go to corner
aim

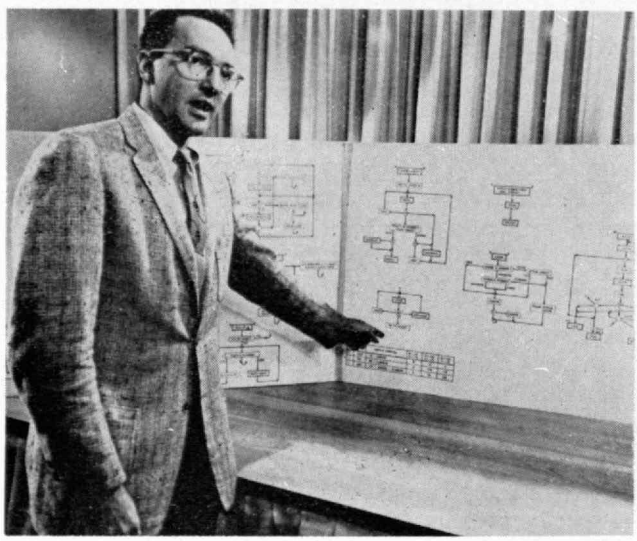
SHERIFF:
see robber
go to window
aim

ROBBER:
aim
fire
MISSED

The program was peppered with switches offering the computer alternative ways by which the climax could be reached. Flow charts showed the various choices, and the computer was aided by a random number generator and numerous sub-routines.

When the shooting began, for instance, it could decide whether each shot was a miss, a nick, or a fatal blow, and proceed accordingly. In the latter case, the

(Concluded on page 46)



Douglas T. Ross, '54, with flow charts for various routines.

Harrison R. Morse, '59, examining the TX-O's literary work.

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New Concepts of Management

Industry's increasing dependence on specialists calls for major changes in the strategy and policies of those who direct others

By Douglas M. McGregor
Professor of Industrial Management

I share with a number of colleagues in the field of management, and with a few managers, the conviction that we will witness during the next couple of decades some profound, far-reaching changes in the strategy utilized to manage the human resources of enterprise. These changes will not be superficial modifications in current practice, but basic revisions of certain concepts which have dominated management thinking during the past half century or more.

The circumstances which will ultimately force these changes are already developing, but their significance is not yet widely recognized. They can be summed up in terms of four trends which are clearly apparent in our society today:

- *The explosive growth of science* (both behavioral and physical) which is yielding knowledge relevant to every function of enterprise —finance, sales, advertising, public relations, personnel, purchasing, manufacturing—as well as research and engineering.
- *The rapidly increasing complexity of technology* in both office and factory—and in related aspects of everyday life such as transportation and communication.
- *The growing complexity of industry-society relationships* with government, consumers, suppliers, unions, stockholders, and the public generally. As a result of world-wide economic development, relations with other cultures will add substantially to these complexities.
- *The changing composition of the industrial work force.* Today more than half the employees of industry in the United States are white-collar. Within the white-collar group, we are witnessing a rapid growth of "exempt" salaried personnel, which includes managers and professionally trained people of all kinds. In one large company, the exempt salaried group has grown from 19 per cent to 35 per cent of total employment in the last decade. The curve is accelerating in line with Parkinson's law, but for reasons other than his witty analysis would suggest.

One major consequence of these trends is that in a few years the single largest and most influential class of employees in most industrial organizations will be professional managers and specialists of many kinds, populating every department and every function. Their utilization of various branches of scientific knowledge to solve practical problems will be the primary basis for planning, decision making, and policy formulation from top to bottom of the organization. As a result of the first three trends I have mentioned they will be both indispensable and powerful, and the necessity to make full use of their competence and training will force a revolution in managerial strategy.

The conventional strategy of management, and the policies and practices as well as organization structures that have developed to serve it, was evolved with the blue-collar wage earner as its primary object. Even he is changing substantially in his education, economic status, attitudes, and competence. But the primary problems of the next several decades will center around the professional specialist. Our present strategy, policies, and practices are quite inappropriate to the task of directing and controlling his efforts. Briefly, let us see why.

Intellectual Creativity

The first and most important reason is the nature of the professional's contribution to the success of the enterprise. His work consists essentially of creative intellectual effort to aid management in its policy making, problem solving, planning, decision making, and administrative activities.

Such professional work cannot be "programmed" and directed the way we program and direct an assembly line or an accounting department. The methods of the industrial engineer are simply irrelevant to it. The management of such work consists chiefly in establishing objectives—the hoped-for results—and in obtaining the professional's commitment to them. It is part of the professional's unique value that *he* is capable of determining the steps necessary to achieve the desired objectives. Often he knows more about this than his boss.

This kind of intellectual contribution to the enterprise cannot be obtained by giving orders, by traditional supervisory practices, or by close systems of control, such as we now apply to blue-collar and clerical workers. Even conventional notions of productivity—based as they are on concepts of effort per small unit of time such as the hour or day—are meaningless with reference to the creative intellectual effort of the professional specialist.

In addition, the complexity of the problems to be solved, the nature of the decisions to be made, frequently will demand collaborative effort by many professional specialists from *different* fields ranging clear across the behavioral, biologi-

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Industrial *leaders of Massachusetts heard Professor McGregor read this paper at a recent conference on "Executive Responsibilities in a Period of Exploding Technology," which was held at M.I.T. It followed a similar conference on "New Opportunities in Materials Science and Technology."*

cal, and physical sciences. As yet, management has acquired but little knowledge or skill with respect to the management of such collaborative teams, or in developing organizational structures which will provide for their effective utilization.

There has been considerable interest in recent years in "creativity," but this interest has centered on identifying people with creative potential and on such gimmicks as brainstorming. Management has not yet considered in any depth what is involved in *managing* an organization heavily populated with people whose prime contribution consists of creative intellectual effort.

Professional specialists are human beings, of course, but their values, their expectations, and their needs are substantially different from those of the blue-collar worker on whom we have lavished our attention in the past.

What Professionals Want

Economic rewards are certainly important to the professional, but there is ample research to demonstrate that they do not provide the *primary* incentive to his peak performance. The real managerial task with respect to economic rewards is to administer them in ways which professional employees accept as *equitable,* in order to avoid dissatisfactions and preoccupations which interfere with performance. If poorly administered, economic rewards can *lower* productivity below a modest, satisfactory level; they do not appear to be particularly potent in raising it above that level.

Much more crucial to the professional—*provided economic rewards are equitable*—are such things as:

¶ *Full utilization of his talent and training,* which means critical attention to the nature of his work, the organization of the functions in which he participates, the challenge built into his job, and his freedom from close and detailed supervision.

¶ *His status,* not only within the organization but externally with respect to his profession. Our tendency to regard staff functions, where most professionals reside, as "burdens" on production is but one way in which we prevent him from achieving status.

In addition, despite some rather paternalistic concessions such as permission to attend professional society meetings, management tends to bind the professional to the enterprise in a fashion which minimizes his opportunity to achieve status and recognition among his colleagues in his field. Publication, and participation in the affairs of professional societies, are far more important sources of status than mere attendance at meetings. Yet, even where competitive secrets are not involved, such activities often are regarded as undesirable distractions from the professional's primary responsibilities to his company. In fact, they contribute to his value, as well as to his status and satisfaction.

¶ *His opportunities for development within his professional career.* Our elaborate programs for *management* development provide few opportunities today for the *career* development of professional specialists. Conventional policies and practices with respect to promotion penalize the man who does not aspire to a managerial job, by requiring him to change his function and assume different responsibilities. Promotion, for the professional, means receiving rewards and recognition for doing better exactly what he has been doing already. Management has given little heed to these values of the professional so far, or to their policy implications. The professional's long-term career expectations are of fundamental importance to him. In private practice or in academic institutions, he is accustomed to choosing among alternative opportunities in terms of these values. Industrial management, on the other hand, is accustomed to exercising a substantial amount of "career authority" over its managerial employees at all levels. The individual is evaluated, promoted, rotated, and transferred in terms of the needs of the organization almost irrespective of his personal career motivations. These incompatible points of view are certain to come into conflict as professional employees become more numerous and more indispensable to industry.

This inconsistency, it is worth noting, has political implications of more than minor significance. One of the distinguishing features of our Western democratic society, we proudly affirm, is that the individual is *not* the servant of the state. It is interesting that the largest and most powerful institution in this same Western society—industry—characteristically administers promotion policies (which profoundly affect the lifetime careers of its employees) with almost complete emphasis on "the needs of the organization." Only his freedom to quit—a freedom which is often too costly to exercise after he has built up a substantial equity in company benefit plans—protects the individual from being in fact "a servant of the corporation" in this rather basic way.

Two Qualifications

Among the qualifications with respect to these generalizations, which should be discussed, two are necessary to mention to prevent misunderstanding:

First, I have talked about a class of people—professional specialists—as though they were all alike, all possessed of the same attitudes, expectations, values, and needs. Obviously, they are not; like any other class of human beings, they differ one from the other in every one of the respects I have mentioned.

Behavioral scientists have studied two groups of professionals lying at the extremes of a range. At one extreme are the "locals" who readily adjust their values and aspirations to the organization which employs them. At the other end are the "cosmopolitans" whose primary identification is with their professional field regardless of where they are employed. Note, however, that there is no evidence to indicate that competence, ability, or potential contribution to the organization are localized in any one part of this range. The comments I have made about professionals should be taken as applying broadly to the middle of the continuum.

Second, although I have directed your attention to a single class of employees, it is obvious that the trends in our society will affect other groups as well. Line managers, for example, will themselves inevitably become more professional, both in training and outlook. The work of wage earners and clerical personnel, as well as their attitudes and expectations, will be materially affected. The growth in numbers and influence of professional specialists in every function of the busi-

ness will nevertheless be the most dramatic of these changes, and the one requiring the most drastic alterations in management strategy.

Self-Direction Is Essential

The four trends described earlier will necessitate many changes in traditional managerial policy and practice. None of them will come about easily, or by superficial modifications in conventional practice. Personnel "gadgetry" will not do the job.

Perhaps the primary change will be in a deep-seated and long-standing conception of managerial control. This conception concerns the necessity for imposing direction and limitations on the individual in order to get him to perform the work for which he is hired. It is, however, an observable characteristic of human beings that they will exercise *self*-direction and *self*-control in the service of objectives to which they are committed. These are matters of degree, of course, but I find few managements who are consciously moving in the direction of substituting self-control for externally imposed controls. The movement, if any, appears to be in the opposite direction, because this concept of self-control is erroneously associated with "soft" management.

In the recognition of this capacity of human beings to exercise self-control lies the only fruitful opportunity for industrial management to realize the full potential represented by professional resources. Creative intellectual effort of the kind upon which management will increasingly rely—in order to remain competitive—is a function of genuine commitment to objectives, under conditions which provide for a substantial degree of *self*-direction and *self*-control.

It is for this reason above all that I believe we are going to see a basic, almost revolutionary change in managerial strategy during the next two or three decades. It will not be possible in the future—because of the trends outlined earlier—for management to rely exclusively on intuition and past experience and "common sense," either in making or implementing its decisions. It will be no more possible tomorrow to manage an industrial enterprise than it is today to fly a jet aircraft "by the seat of the pants." Creative intellectual effort by a wide range of professional specialists will be as essential to tomorrow's manager as instruments and an elaborate air traffic control system are to today's jet pilot.

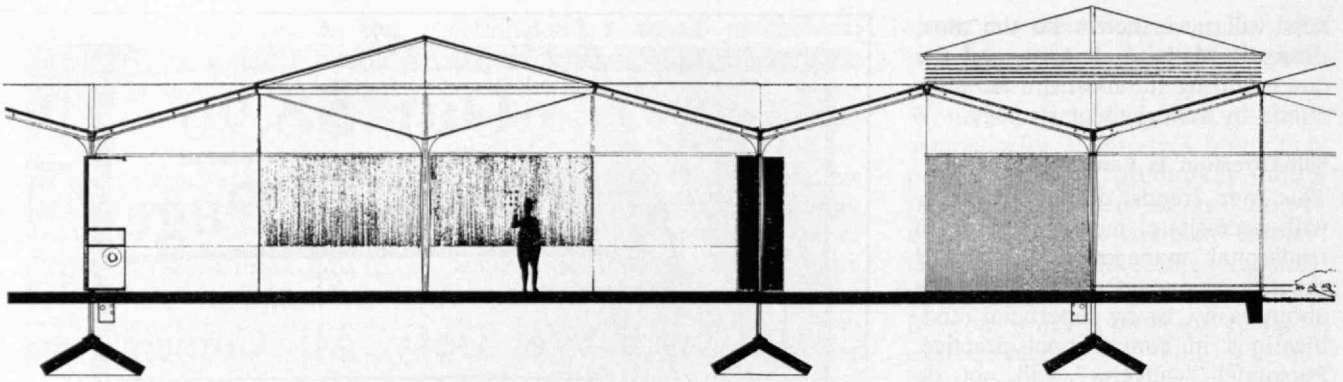
But traditional managerial strategy is primarily geared to the elaborately "programmed" and closely supervised activities of the blue-collar production worker and the clerical employee. As professional specialists become the single largest and most important class of employees in the enterprise, this traditional strategy will become hopelessly inadequate. Its greatest inadequacy will be with respect to its central concepts concerning the control of organized human effort. Management by objectives and self-control will inevitably replace management by authority and externally imposed control. In the long run this change in strategy will affect not only professional employees but all the human resources of enterprise.

Industrial management is not entirely unaware of the necessity for change in its strategy. There is already some genuine concern over the inadequacy of current methods of control. Symptoms of underlying difficulties have been apparent for some time in industrial research laboratories (where professionals are numerous) and in engineering functions (where they are becoming so). But there is as yet little recognition that these are symptoms which will soon spread to every phase of business activity. When this recognition does occur, we will have the impetus for the development of a new managerial strategy without which the enterprise of the future will be unable to prosper.

In the Good Old Days . . .

THEODORE V. HOUSER, *retired chairman of the board of Sears, Roebuck and Co., and Life Member of the M.I.T. Corporation, has given the Institute a mile of microfilm showing the company's catalogues from 1892 to date. In accepting the 51 rolls of film, Professor William N. Locke, Director of Libraries, pointed out that they will be useful in studies of price indices, advertising trends, changes in transportation, and many other aspects of American life.*

These pictures are from a catalogue that came out in the 1890's; $57 would then buy a Columbus buggy with a full leather top. Covered wagons were listed until 1924. The first talking machine appeared in 1898, and silk stockings arrived in 1912.



The roof line will be distinctive and the number of rooms can vary.

Students Are Ready to Erect Prefabricated Plastic School

M.I.T. CENTENNIAL visitors this spring will see an experimental plastic schoolhouse if the weather permits its builders to proceed on schedule. The foundation is in, parts of the building are being fabricated now, and a student crew is prepared to assemble them.

This will be a prefabricated modular unit, so designed that it can be employed in a variety of ways. By fitting such units together, as many classrooms, offices, and other accommodations as a community may desire can be provided in a single structure. Or a series of separate buildings can be erected. In either case, the economies of mass production can be realized, and the need for a new school plant met more quickly than by conventional methods of construction.

The first such unit will go up between the M.I.T. playing fields and Memorial Drive, near the Smith House, in Cambridge. There it will be subjected to a variety of tests and actually used, it is hoped, as an elementary school classroom.

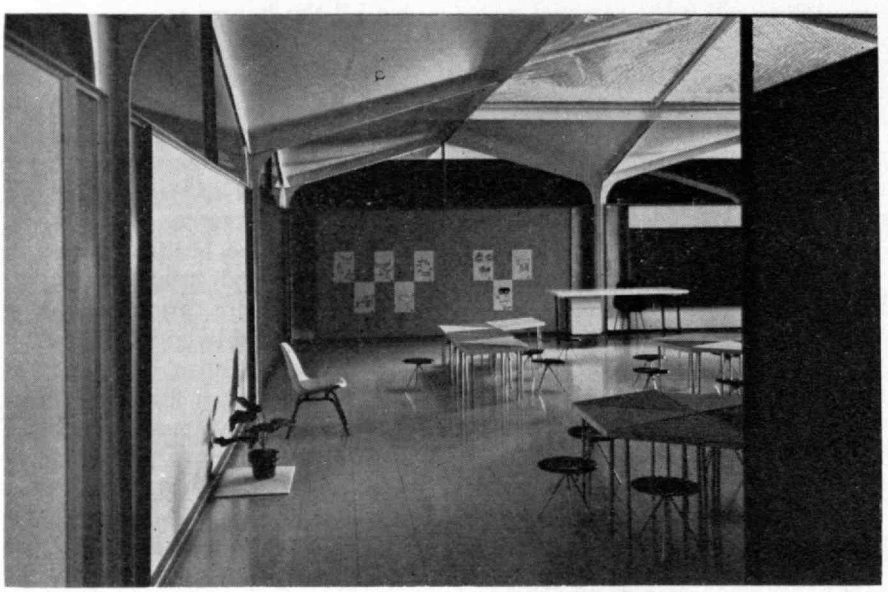
The basic structural unit of its roof will be an inverted umbrella, 16 by 16 feet, formed by four hyperbolic paraboloid panels supported by a central column. Such panels can be formed easily from straight members or molded. Drainage will be through the central column. In the center of a bay of such units, a skylight can be provided by arranging the panels so that the umbrella points upward rather than down.

The supporting columns will be set upon the reinforced concrete slab and footings that form the base of the structure. The roof will go up first, and other plastic panels then will be set in place as walls. The exterior wall panels will not extend all the way up to the sloping roof, and laminated safety glass in the space between the walls and roofing will complete the enclosure.

All of the panels will be laminates of glass fiber-reinforced polyester and acrylic sheets separated by a 1½-inch-thick foam core. An 8-by-8-foot panel will weigh only about one-tenth as much as a comparable concrete shell, and all units should be comparatively easy to ship and assemble.

The Department of Architecture has been investigating the potentialities of plastics as building materials since 1954, and worked out this plan for a prefabricated school with the Department of Civil and Sanitary Engineering.* It has been assisted by the Monsanto Chemical Company, the Owens-Corning Fiberglas Company, Alcoa, General Electric, Du Pont, and many other firms and individuals. Mitchell M. Hannoosh, '50, of Polystructures, Inc., undertook fabrication of the roof panels, and William M. C. Lam, '49, worked on the wall lighting. Other participants have included the Crocker Company, the Nopco Chemical Company, and the Durez Plastics Division of Hooker Chemical Corporation. Help in dealing with acoustics was provided by Bolt, Beranek and Newman.

Marvin E. Goody, '51, has been the project supervisor and his staff has included Frank J. Heger, Jr., '48, and Joseph J. Schiffer of M.I.T.



This is a photo of a model; the interior arrangements will be flexible.

* See "A Schoolhouse Built of Plastic Panels," Technology Review, Nov., 1959 (p. 23).

When You Edit a Report . . .

Here are 10 guideposts to developing a rapport with engineers that will help achieve your goal

BY ROBERT R. RATHBONE

IF YOU are a technical supervisor faced with the added responsibility of editing the reports your engineers or scientists write, you've probably wondered how you can handle the job more efficiently.

Perhaps editing is a new field for you, posing many problems of procedure, policy, or technique. And perhaps you feel a bit uncertain about the way you've met some of these problems. In any event, an opportunity to check your standards against those of others might be both reassuring and profitable.

This article is a collection of the common guideposts that many professional editors have found useful in developing a rapport with engineer-writers. It is intended as a companion piece to an article on report writing already published in The Technology Review.*

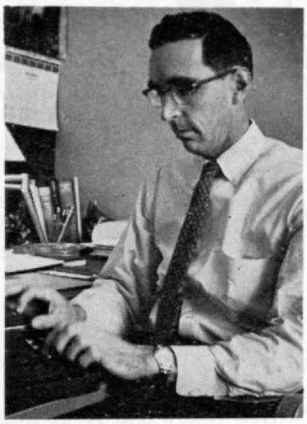
Your primary function as an editor is to guarantee that the reports your engineers write meet certain standards of content, organization, style, and format. Your goal is undeniably clear. How you accomplish the feat is the major problem.

You cannot succeed, of course, unless your writers know what the standards are; so your first task is to acquaint them with the ground rules. But this is merely a necessary formality. Your main duty is to instill a genuine desire for self-improvement.

Stimulate Interest

In your dual role of technical supervisor and editor you have a better-than-average opportunity to stimulate writer interest. You have daily contact with your men on technical matters and you can tie their writing directly to their research or engineering. This gives you a definite advantage over the editor who doesn't have a formal technical background or who edits full time.

Interest is contagious. At the outset, be enthusiastic about the importance of good writing. Tell your new engineers how the company uses its technical reports, how much the reports cost in man-hours and cash, who the readers are, and how much they rely on the reports. Point out that a clear, precise report never cost its author a raise in salary, and ask your director to tell each new group why the company is interested in helping its engineers and scientists become good writers.



ROBERT R. RATHBONE, *Associate Professor of English at M.I.T., has helped both undergraduates and established engineers and scientists produce better technical reports. He has been in charge of an intensive one-week summer course in technical writing for several years, and has edited reports regarding research in many different kinds of industrial laboratories.*

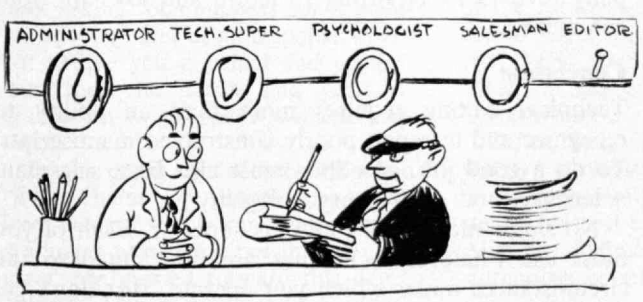
Since every writer has a certain amount of mental and physical inertia to overcome, you should make the writing job as straightforward as possible. Many factors are under your control: you can assign the report early in the project, you can allow a realistic time for its completion, you can see to it that the draft an author submits for editing is returned promptly, and you can be sure that he has secretarial help and up-to-date reference books. And finally, you can give him some privacy. He needs a quiet place to do creative work; help him find it.

An equally obvious way to stimulate interest, yet one too frequently ignored, is to praise a job well done. Don't be known only for your criticisms. It is indeed rare that a report does not have some feature worth praising. When you hold an editorial conference, put the author at ease by starting your discussion with a word of encouragement. Later, if the published report has been well received, make a point of mentioning it at the next meeting of your project group.

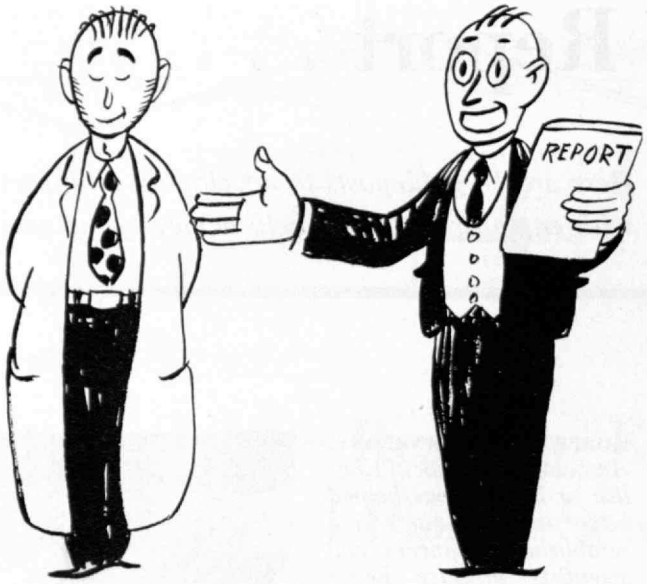
Along with praise, offer a friendly ear. Being a good listener, *within reasonable limits,* has its advantages: you gain the respect of your writers and establish them as the key participants; you also have less work to do.

Nearly every writer likes to see his name in print. Perhaps certain reports that your organization issues do not carry by-lines. If there is no strong reason for omitting the author's name, or if the original reason is no

* "When You Write a Report," Technology Review, March, 1960.



Extra hats help an editor working with technical writers.



Praising work well done is one way to stimulate interest.

longer valid, try to have the policy changed. Most of us write more carefully when we have to sign our names to what we say.

Check Your Technique

Once you begin to criticize a piece of writing, you immediately put the author on the defensive. You are attacking his "baby," and you should do so with diplomacy.

Here are some practical suggestions for improving your technique:

1. *Require an outline.* Persuade your writers to produce an outline before they begin to write. Don't be petty about the form, but have them include enough details so that you can evaluate the intended coverage and organization of the report. Afterwards, discuss your ideas in an editorial conference; the writer should not go ahead with the job until the two of you agree on the outline. Some writers will complain that outlining requires extra work; your rebuttal is that a review of the outline constitutes a pre-editing of the report and actually saves work.

2. *Refuse a "rough" draft.* The manuscript that the author sends to you for editing should represent his best effort. You fight a losing battle if you allow him to become careless. Demand clean, pre-edited copy.

3. *Do not revise for the author.* Most editors agree that it often would be easier for them to rewrite an entire report than to get the author to revise it properly. But the mistakes are the author's and he should do the revising; otherwise he will make the same types of errors in his next report. You are doing neither the author nor yourself a favor if you fail to hold this line of responsibility.

4. *Spell out your criticisms.* You must be specific when you criticize someone else's writing. General comments such as "not clear" or "you can do better than this" do not help the author with his revisions. Pinpoint what is not clear and then suggest a plan of attack. If you take the time to give detailed comments, the author will be more inclined to view your criticism as constructive.

5. *Be prepared to justify your stand.* Decisions to have an author revise his writing must not be made arbitrarily. You might not say something the way he does, but this is not sufficient reason for him to change his way. You are the boss, nevertheless, and if he violates any of the rules of good writing, good taste, or company policy, you have every right to call these violations to his attention. If he doubts your judgment, justify it by referring him to an accepted authority. Many organizations have published their own style manuals to serve this purpose.

6. *Spare the blue pencil.* Probably nothing is more discouraging to an author than to receive his manuscript covered from beginning to end with an editor's scratchings. Never cross out entire sections or pages; if you haven't space in the margin for your comments, prepare a separate comment sheet and cross-reference it to the text by numbering the references in sequence. Some editors use a preprinted form that can be filled in quickly and neatly as they edit.

7. *Stress the major errors.* All your criticisms will not be of equal importance. Assign top priority to any error that threatens clarity, such as poor organization of thought or inadequate background material. Relegate to a secondary role most errors in spelling, punctuation, and mechanics—in other words, don't be a "nit-picker."

8. *Confer with the author.* After the author has had a chance to look over your written comments, arrange for an editorial conference. More can be taught in an informal, face-to-face session than by any other method. For example, in discussing a passage that isn't clear, let the author tell you in his own words what he meant. The chances are good that he will produce a satisfactory on-the-spot revision.

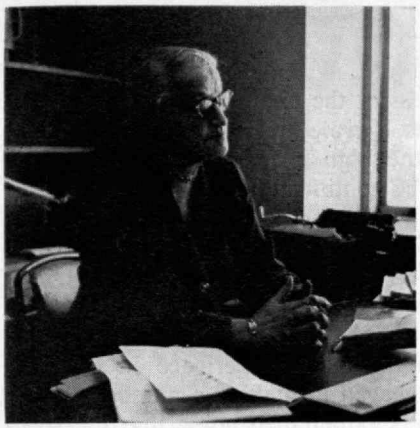
9. *Be an impartial critic.* Always be consistent in your judgments: what is wrong for one author, under given conditions, cannot be right for another. This doesn't mean that you can't adopt new rules and modify old ones. But while a rule is "on the books," hold to it. As a practical matter, you would be wise to start with a few major rules and add to them only as experience dictates. Get together with the other supervisors in your department and compare notes. Consistency on this broader level also is important.

10. *Assume full responsibility.* There can be several reviewers of a report but there must be only one editor. Any multiple-editor scheme is inefficient, costly, and ineffective. It results in buck-passing and name-calling. How can you change it? Perhaps you can't, but at least try. The best time is when you are asked to take on the editing job; the next best is when the company reviews its reporting structure and asks for your comments.

Conclusion

Technical editing requires more than an ability to recognize and to repair poorly constructed manuscripts. To do a good job, an editor must also be a salesman, a teacher, and even a psychologist.

No single method of editing is superior. Each of you must use whatever techniques are best suited to the circumstances under which you operate. Just don't get into a rut. You are dealing with a precious commodity and it deserves your best talent.



An Unforgettable Secretary

Some recollections of Olive Barnard whose own recollections "were little short of fantastic"

PROFESSOR EMERITUS ERWIN H. SCHELL, *'12, recalled the anecdotes which constitute this article at the dedication last year of the Olive Barnard Room on the first floor of the Sloan Building at M.I.T. Miss Barnard is pictured at the left, and the plaque now in the room is shown below.*

I REMEMBER well her first appearance at the office, wearing a severely tailored suit, a dark straw hat and carrying a small silk umbrella. I recall feeling a little scared, which may account for the vividness of my recollections. This was the first secretary I had ever had.

Her typing was meticulous and from the beginning it was obvious that her high standard of performance was a natural attribute. Moreover, she thought about the job to be done. More than once of a morning I would remark: "I should have sent that letter airmail last night" only to have her respond: "It was so mailed."

A kind of natural dignity was an inherent part of her character. One morning the elements conspired against me and I was badly late for my nine o'clock class. Somewhat out of breath, I said to her: "How did you manage to keep the boys from leaving the room?" "I stood in the door," she replied.

We often found ourselves repeating her colorful observations. During a temporary installation period the passageway outside her office was insufficiently illuminated. She remarked: "One needs the *eyes of a mole* to navigate this corridor!"

Early among her departmental responsibilities was the task of student placement. It was here that evidence of her phenomenal memory soon appeared. Her summer vacations in New Hampshire were certain to be interrupted by telephone calls from my desk asking for nominees for a possible opening. Her usual response would be: "Have you a pencil and paper?" And then the names and years of graduation would follow without hesitation.

In the depth of a depression when "living chains" of Alumni were organized, along which our most recent graduates passed for possible employment, she carried forward this development. Her reputation as a superb judge of human nature soon won for her the respect and confidence of the industrial "ivory hunters." She was frequently asked by industrial employers to make personal selections for their needs; and her choices came to be accepted without question.

She frequently was better informed regarding existing personnel resources than was the company itself. During the height of wartime activities she received a telegram from one of our largest airplane manufacturers, saying: "Please wire us names and addresses of Course XV graduates now employed by this company."

☆ ☆ ☆

Her recollection and immediate recognition of people, even under difficult circumstances, was little short of fantastic. On one occasion a former secretary returned with her husband to the Department for a visit. Previously he had always appeared in uniform; but now he was in mufti. In addition, he concealed himself behind large dark glasses. As he walked alone into Miss Barnard's office, she smiled and said: "How do you do, Captain! And how is your wife?"

She had little interest in rumor, gossip or hearsay. At one period Technology was without a president; and speculation was rife as to who the new man would be. At this time Miss Barnard was having luncheon almost daily with Miss Miller, an administrative secretary in the presidential office. When the news was released and it was found that Miss Miller had known of the future incumbent for a considerable time, longer than did anyone else, Miss Barnard remarked dryly: "Well, in any event, she didn't learn it from me."

Before long, as her talents became widely appreciated and her warm friendliness enjoyed, her office was steadily visited by undergraduates and Alumni. Ultimately she became a storehouse of information about wellnigh everyone of importance along the Atlantic seaboard and all points West. I remember asking her if by any chance she knew of a certain family in Groton. She replied: "Yes, I know a little about them." She then talked for 13 minutes, ending by saying: "That's about all I know."

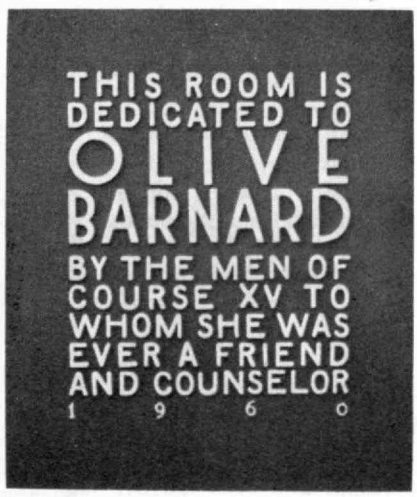
One of her recurring tasks was the maintaining of an up-to-date mailing list of graduates—a routine which had little of variety to commend it. With the steady increase in the alumni body, this became a truly formidable chore. Again, the preparation and mailing of our departmental letters to the thousands of graduates was no mean accomplishment; but she never failed to have the addresses in complete order when an issuance was due. I may say that when such climactic activities were called for, I gained the impression that my absence from the office was not only favored but welcomed.

☆ ☆ ☆

Her talents became widely recognized. Course XV Alumni arranged a 7,000-mile trip throughout the country for her, meeting with groups in many cities. On this extended tour she took almost no alumni records because, as she put it, she was "familiar with the cards."

Her contribution of effort, of high standards, and of loyalty to the De-

(Concluded on page 38)



Institute Yesteryears

25 Years Ago . . .

IN FEBRUARY, 1936, The Review announced the development in the Department of Physics "of a gamma ray detector, an extremely sensitive instrument for measuring such radioactive materials as radium, thorium, and uranium, by means of their invisible gamma radiations. The significance of this device lies not only in its usefulness for basic studies in radioactivity, but in its application medically for diagnosing radium poisoning. . . .

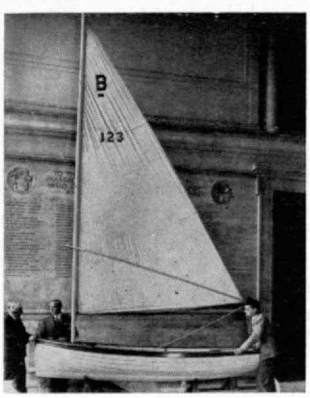
"Several years ago, the cases of five New Jersey girls, who had ingested fatal doses of radium while painting luminous figures on watch and clock dials, attracted wide attention. Hundreds of cases remained unpublicized. Post-mortem examinations showed that only ten-millionths of a gram of radium, deposited in the bones by body chemistry, would cause death. In spite of this knowledge, some industrial users of radium failed to modify their shop technique so as to protect their workers properly. . . .

"The gamma ray detector, which was designed by Dr. Robley D. Evans, now makes possible unambiguous laboratory tests which can reveal the presence of chronic radium poisoning five years before any clinical symptoms appear."

¶ Congratulations were being received by *John H. Gregory, '95*, and *Robert A. Allton, '13,* to whom had been awarded the Rudolph Hering Medal of the American Society of Civil Engineers . . . by *Gerald F. Loughlin, '03*, upon his appointment as Chief Geologist of the U. S. Geological Survey . . . by *Frank W. Caldwell, '12*, upon being honored by the Sylvanus Albert Reed Award of the Institute of the Aeronautical Sciences . . . and by *Clarence D. Howe, '07*, upon becoming Minister of Transport of Canada.

¶ Also, The Review reported a "proposal submitted to a mass meeting of undergraduates that sailing be made a student activity [had] received an enthusiastic response, and plans have already reached the stage where it is possible to announce that a fleet of sailing dinghies will be ready by spring. Twenty-five boats are assured . . .

"The design has been completed by the Department of Naval Architecture and Marine Engineering and dinghies will be built immediately. Professor George Owen, '94, is chairman of the committee and his associates are Henry A. Morss, '93, and Walter C. Wood, '17."



At right: The Tech dinghy.

50 Years Ago . . .

THE REVIEW'S Editor, I. W. Litchfield, '85, commenting upon "the success of the undergraduate societies in the various Courses, [wrote] it is apparent this year [1910-1911] that the high character of the work of these societies will be continued, if not improved. . . .

"The Aëro Club is one of the most active of the special engineering clubs, and the work it is doing is being taken up so thoroughly that the members of the engineering committee are practically taking an option in aëronautics. The club has been addressed by practical men who have had experience in aviation. The committee is engaged in making a number of fundamental experiments rather then going into the spectacular side. It is being treated as an art, not a sport. It is true that a number of flights have been made with the glider 'Technology I.' It was entered in one contest where it won first prize, but in general the line of work has been purely experimental."

75 Years Ago . . .

"IT IS HOPED," wrote the Editor of *The Tech*, that the Glee Club will be reorganized this year, and continue as successfully as it has during the past two years of its existence. The hearty support and encouragement, financial and otherwise, given it by the students at large, have shown how much it was appreciated as a means of contributing to the social part of our life at the Institute, which, as we all know, necessarily comes in for a small share of our time. . . .

"At present it is difficult to find anyone capable of filling the position of musical director; but it does seem as if in a college of our size, numbering from six to 700 students, at least one might be found competent to fill the place!"

¶ Betterment of the athletic facilities was another perennial editorial objective of *The Tech*, for example:

"Occasionally some enthusiastic freshman whose curiosity has been aroused, during the hours of military drill, by the sight of the different pieces of gymnastic apparatus about the gymnasium, seeks out that remote solitude, and variously employs the pulley-weights and other appurtenances to the place.

"He may return for a second time, but the probabilities are that, unfavorably impressed by the scarcity of the apparatus and the general inconveniences of the place, he will not. If he has a natural fondness for athletic sports and exercise, he will join some other gymnasium; if not, as is the case with three-quarters of them, he will never again enter our own, except when compelled to for military drill. . . . Assuming that our gymnasium—or drill-shed, as it is variously called—was intended, in a certain measure, for a gymnasium, it seems to us strange that better facilities for exercise are not afforded there. The greatest need, however, is for a gymnasium instructor, who could teach the students in regard to the proper use of the apparatus, and point out their deficiencies and their needs. . . ."

96 Years Ago . . .

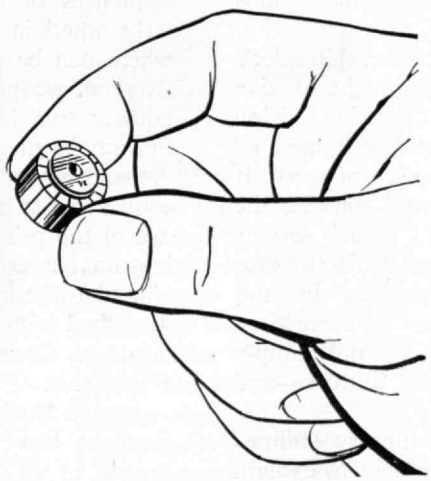
ON MONDAY, February 20, 1865, President William Barton Rogers made the following entry in his diary: "Organized the School! Fifteen students entered. May this not prove a memorable day!"

BUSINESS IN MOTION

To our Colleagues in American Business . . .

It has often been mentioned in these messages that in order to produce the best possible product at the least possible cost, it is a good idea to take your suppliers into your confidence . . . tell them your problems . . . seek their aid.

The following incident is a striking example of the advisability of doing just that.



The Dayton Precision Manufacturing Company, maker of the commutator you see illustrated, was having difficulties with the ferrous metal it was using for the hub; for not only did the rod from which the hubs were fabricated have to be drilled but it also had to be able to withstand a flanging operation. Their Chief Engineer decided to discuss this with one of Revere's Technical Advisors.

After a thorough study of the problem Revere Brass Rod of a certain alloy was recommended and samples were furnished. The manufacturer found the machinability of the brass rod to be outstanding, being readily and speedily drilled. Also, it withstood the flanging operation . . . a set of manufacturing conditions where only brass, the right kind of brass, outshines all other metals and alloys.

The final score showed that the low first cost of the brass rod, plus the fact that it could be machined faster and more easily than ferrous metal, resulted in a superior product at a saving in production cost. A further advantage was the added sales appeal of the brass hub.

There you have another example of how Revere in collaboration with the manufacturer's engineering department, helped "fit the metal to the job," which resulted in a better part at the least possible cost.

Revere, a supplier, is conscious that still other suppliers can often collaborate to help customers produce a superior product for less money.

And because almost every industry you can name is able to cite similar instances, we suggest that no matter what your suppliers ship you, it may pay you to take them into your confidence.

REVERE COPPER AND BRASS INCORPORATED
Founded by Paul Revere in 1801
Executive Offices: 230 Park Avenue, New York 17, N. Y.
Distributors Everywhere

Books

THE WATERSHED: A BIOGRAPHY OF JOHANNES KEPLER, by Arthur Koestler; Doubleday Anchor (95 cents). *Reviewed by Bruce Mazlish, Assistant Professor of History at M.I.T.*

THE PHYSICAL Science Study Committee, in publishing Arthur Koestler's *The Watershed*, has made available —to students and general readers alike—an exciting and thought-provoking book. Its hero is Johannes Kepler, one of the two or three great scientists marking the breakthrough from the mystically colored medieval world view to what one recent author has called "the edge of objectivity," i.e., the modern scientific method. Koestler also gives us a full-length sketch of Tycho de Brahe, and supplies a few quick strokes for the cartoon of Galileo: but both are seen largely in relation to the "strange, tormented genius" who discovered the famous three laws.

The Watershed is actually taken from Koestler's larger work, *The Sleepwalkers*, which sought to give a comprehensive "History of Man's Changing Vision of the Universe." This does not prevent *The Watershed* from being a self-contained, complete piece of work. It is not, however, as the editor's foreword implies, the first or only biography of Kepler. Max Caspar's serious and pedantic *Johannes Kepler* (Stuttgart, 1948; also recently translated into English) precedes it, and Koestler willingly acknowledges this fact by using Caspar's scholarship. Koestler, however, is not simply popularizing: he has gone directly to the sources—and mastered them for himself.

Koestler musters his scholarly and literary abilities in the service of a noble ambition: he wishes to explain the creations of science—its theories—and to depict the personality of the creative scientist, and then to examine the two together, attempting thus to decipher the puzzling code of scientific creativity. He succeeds fully in the first part of his task: the three laws are lucidly presented and explained, and Kepler's character is brilliantly portrayed (though perhaps with a few too many questionable Freudian insights). The second part of the task is more difficult, and, I believe, Koestler is less successful here. There are many who will question his over-all thesis that the Seventeenth-Century scientists made their discoveries more or less like "sleepwalkers"—blindly and in dreamlike fashion.

The "Watershed" metaphor, i.e., that the Western mind stood between "two universes of thought" in the Seventeenth Century, seems better taken, and Koestler's insistence that the change in man's vision of the universe was gradual and piecemeal is nicely sustained. Even the extension of the "watershed" metaphor, from the macrocosm of the course of scientific discovery to the microcosm of Kepler's life (for Koestler treats him as a "split personality"), is acceptable for what it is—an intriguing exercise in the explanation of the creative process in science. Indeed, one of the great virtues of Koestler's book is that it so forcefully shows that science, rather than being an impersonal affair, is the work of men of flesh and blood, with loves and hates. And these passions seem to influence what takes place in scientific discovery.

I cannot resist adding one note. In this age of satellites—a term probably first coined by Kepler—and space exploration, we are reminded that Kepler wrote what Koestler claims to be "the first work of science fiction in the modern sense": *Somnium*, a dream of a journey to the moon. The dream is turning out to be a reality; and Kepler, who looked back to the mysticism of the past, also looked ahead to the methods and discoveries of the future. But is this not to say merely that science fiction was—and is—the mythology of the future?

MY WILDERNESS: THE PACIFIC WEST, by William O. Douglas, illustrated by Francis Lee Jaques; Doubleday and Company ($4.95). *Reviewed by Donald J. Lovell, '45.*

ENGINEERS and scientists are increasingly faced with the moral and social judgments associated with the consequences of technological progress. This is particularly noted in fields associated with harnessing power which can be utilized for the manufacture and/or delivery of weapons capable of mass extermination. It is equally true in a much less dramatic and publicized fashion in the inexorable vanishing of our wilderness areas. Lumber interests, cattle grazing, and more recently tourist trade have all combined to rob our heritage of the priceless beauty, incomparable majesty, and inestimable significance that the wilderness areas provide. Nowhere else have I seen the meaning of this described with fervor and compassion equal to that of Supreme Court Justice William O. Douglas in *My Wilderness.*

Justice Douglas finds the solace and comfort in his frequent treks through the wilderness areas that is known to all who have slept out under the stars, or scaled a lonely mountain peak, or fished a remote stream. However, Justice Douglas also is able to express these sentiments with a clarity and passion that border on the poetic. This fervor is much more effective than would have been the recitation of a narrative concerning a specific visit.

His observations of animal life and plant growth are combined with aesthetic appreciation and scientific understanding, indicating the importance of each contribution to the balance of the whole. I would find it difficult to believe that anyone could read this book and not be in sympathy with Justice Douglas' plea to preserve these few remaining wilderness areas from the encroachments of roads and highways that provide avenues for the beer-can-slinging depredations of picnickers and campers.

The book is divided into 11 chapters to describe that many areas. These include: the Brooks Range in Alaska, the Washington-Oregon mountain areas, the Middle Fork of the Salmon area in Idaho, and the High Sierra of California. Impressive etchings by Francis Lee Jaques complement the writing. Engineers and scientists will do well to read the book.

(Book news is concluded on page 40)

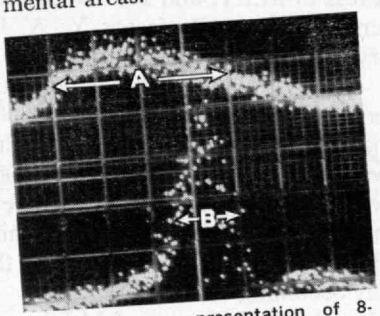
High Voltage Engineering Corporation . . .

"CHARGED PARTICLES"

Nanosecond Pulsing

The timing of nuclear events and the discrimination between them continues to be a major hurdle for the experimental physicist.

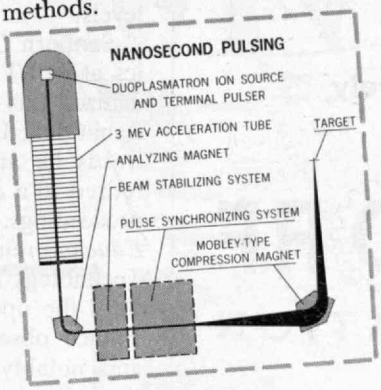
We don't need a market research program to reveal the need for apparatus which will assist the experimenter to do accurate neutron time-of-flight work or to determine excited state lifetimes in the milli-u-sec. region. Ultra-short high-intensity pulses of charged particles, and the resulting neutron bursts, provide one of the most promising techniques in these experimental areas.



Lumatron scope presentation of 8-nanosecond terminal-pulsed beam (A) and compression to 2-nanosecond post acceleration pulse (B).

We have completed the development of a system for producing and measuring *pulsed proton beams with an intensity of several milliamperes and a pulse duration of less than one nanosecond (10⁻⁹ seconds).* The first research results from this apparatus are soon to be reported.[1]

The beam is accelerated to 3-Mev by a Van de Graaff fitted with a terminal pulser of the deflection type, delivering ion pulses of 10 ns duration every 1000 ns at the input end of the acceleration tube. After acceleration, the pulse is compressed by a 90° double-focusing Mobley[2] magnet whose radius of curvature is 30 inches. The deflection electrodes at the entrance of the magnet are driven by a 10 Mc sinusoidal voltage which is synchronized with the pulse from the accelerator. Observations were made with a time-to-pulse-height-conversion measurement system checked by nuclear methods.



1 *L. Cranberg, et. al., to be presented at Am. Phys. Soc. Meeting, New York (February 1961)*

2 *R. C. Mobley, Phys. Rev. 88, 360 (1952)*

Isotopes of Rare Purity

The need for pure isotopes in work concerned with nuclear structure and particle reactions has led us to develop a new, broad-range electromagnetic isotope separator that is faster, simpler to use and provides purer samples than any comparable equipment we've seen.

This instrument is designed to produce up to 10 microamperes of individual particle beams — *with a mass resolving power better than 400.* Separation is achieved in a 5000-gauss, 160 cm radius magnetic field. Time for recovery of samples after collection is less than two minutes. Those who have had their decay schemes disappear before their eyes will appreciate this bit of engineering in working with short-lived isotopes.

The instrument can also be used to produce nuclear targets for studies of energy level, scattering, neutron cross-section or other phenomena, as well as pure radioactive tracers. Two of these instruments are now being built for U.S. atomic energy program. Specifications for the machine are presented herewith.

160 CM ELECTROMAGNETIC ISOTOPE SEPARATOR

Range:	Atomic mass 1 to 400
Current:	$10\mu\alpha$ of most abundant isotope ($100\ \mu$ achievable with some loss in resolving power)
Voltage:	80 kv
Magnetic Field:	5000 gauss
Field Stability:	Better than .01 per cent
Ion Sources:	Modified Arc
Operation:	Time for removal of collector after full operation — 2 minutes
Vacuum System:	All metal bakeable gasketing

Accelerator Conference

The 2nd Accelerator Conference held recently in Amsterdam was a rewarding occasion for High Voltage and its Dutch affiliate, High Voltage Engineering (Europa) N.V. Three hundred participants from 24 countries joined in this exchange of information on accelerators and experimental techniques. There was some healthy give and take between the "ideal" machine described by physicists and the "present state of the art," reported by our engineers. If there were no gap between what is wanted and what is commercially available, most of us could pack up and go home.

As things stand, High Voltage continues to push its development to the limit and is glad to share a challenge with its insatiable customers in research.

The Conference Proceedings were published in a January special issue of *Nuclear Instruments and Methods.* Check with your librarian, or write us for a complimentary copy.

HIGH VOLTAGE ENGINEERING CORPORATION

BURLINGTON, MASSACHUSETTS, U.S.A.

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APPLIED RADIATION CORPORATION

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HIGH VOLTAGE ENGINEERING (EUROPA) N.V.

Trend of Affairs

(Concluded from page 16)

Physics for Everyone

PARTICIPANTS in an International Conference on Physics Education in Paris last summer agreed that:

"Physics is an essential part of the intellectual life of man . . . and the study of physics provides a unique interplay of logical and experimental discipline. . . . Studying physics and the physicist's methods . . . should therefore be regarded as a necessary part of the education of all children.

"In many countries, education in physics, both for nonspecialists and for future specialists, is unsatisfactory. In all countries, improvement is essential at some levels."

Sanborn C. Brown, '40, Associate Professor of Physics at M.I.T., was chairman of the committee that organized this conference at UNESCO House for the International Union of Pure and Applied Physics. Afterwards he and Norman Clarke, a British participant, retired to a quiet English inn with the transcript of the proceedings. From this they prepared *International Education in Physics,* a book recently published by The Technology Press of M.I.T. and John Wiley & Sons.

In the opening address, Professor Y. A. Rocard of France observed that "the development of science—and notably of physics—is rising exponentially with time. But people themselves do not develop exponentially; they have a period of growth, then they wither and pass away . . . Man becomes useful in science later and later in life, and becomes useless earlier and earlier." Hence, he felt, the problem of training "physicists of the most useful sort and useful for the longest time" is rapidly becoming crucial.

Professor Jerrold R. Zacharias of M.I.T. gave one of the principal addresses, in which he described the program of the Physical Science Study Committee, and this program was further explained in papers submitted, including one by Stephen White about the films.

"In answer to the question as to whether there was a group in the United States interested in developing a mathematics 'PSSC' course," the book reports, "Professor Zacharias replied that there was, but that he did not feel that it would have a significant effect on the Physical Science Study Committee program. He felt strongly that the necessary mathematics should be incorporated into the physics course."

The cost of this educational venture ($5,000,000) seemed high to some delegates but Professor Zacharias pointed out that it was a trivial fraction of the total spent on education in this country.

Professor Brown described "the Lexington Plan" which permits high school physics teachers to gain experience in industrial laboratories, and expressed the hope that this idea will spread.

In the resolutions finally adopted, the conference declared that educational experiments such as these should be welcomed and encouraged, although solutions may differ in different countries, and stressed the need for better teachers. "Physics should be taught by physicists," the delegates declared, and steps should be taken to make physics teaching both more efficient and attractive as a profession.

NEW HIGHS, NEW LOWS— Neurosis!

Even to the investor endowed with patience, the price movements of his carefully chosen stocks are often baffling.

New highs for some; new lows for others—on the same day. Inconsistent? Haphazard?

Even if his selections seem to be doing well, he may worry about how long they will continue to do so.

Or he may, like many other investors in search of a more satisfying solution, place his securities in an Investment Management Account with the Trust Company.

UNITED STATES TRUST COMPANY

OF NEW YORK

An Unforgettable Secretary

(Concluded from page 31)

partment, the Institute, and the Alumni was commemorated by an honorary membership in the Alumni Association of the Instiitute shortly before her passing.

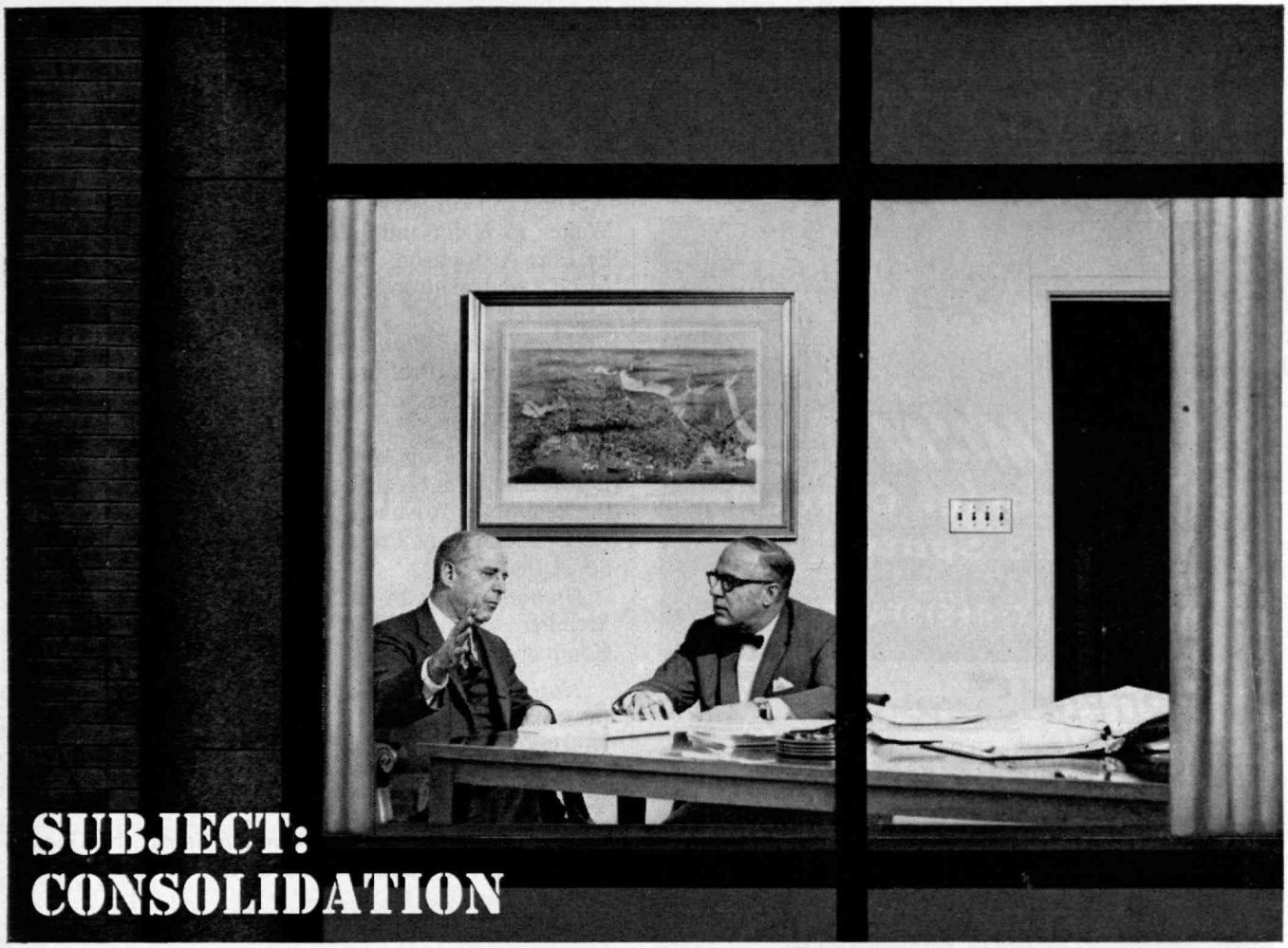
As I look back, it seems to me that one of her major contributions to the Department was her individualistic approach to all problems affecting students. Frequently a matter of policy would arise which would become fruit for departmental discussion. At such times most of us would talk to the issue, viewing the students involved somewhat as a composite group. This Miss Barnard would never do. She would say, "I think the idea would appeal to some men in the class, but not to all"; and she would proceed down the list, one by one, and forecast their individual reactions. It was not so much a balanced over-all judgment as it was a mosaic of judgments built out of a profound knowledge of each of those who made up the group. Needless to say, this uncompromising belief in the importance and uniqueness of every individual student won her great regard and deep friendship from both Alumni and undergraduate students.

☆ ☆ ☆

Many years ago one of our Faculty members was asked by a prospective client to make a formal request in writing that his services be employed. The letter was typed, signed, and mailed during my colleague's absence from his desk. After the proposal was approved and put into effect, the president of the company confided to the professor that he had submitted the signature to a handwiting expert for character analysis. The report was as follows:

This man is of high character. He can be absolutely depended upon to do whatever he says he will do. He may be a bit firm at times.

The professor's signature was in the handwriting of Miss Barnard.



SUBJECT: CONSOLIDATION

C. RODGERS BURGIN AND RICHARD P. CHAPMAN TALK ABOUT THE PERSONALITY OF THE NEWLY FORMED

NEW ENGLAND MERCHANTS NATIONAL BANK

AND THE PERSONAL SERVICE IT PROMISES YOU.

Mr. Burgin is Chairman of the Board and Mr. Chapman is President of the New England Merchants National Bank, formed by the consolidation of The Merchants National Bank of Boston and The New England Trust Company on December 31, 1960.

CHAPMAN: Rodgers, we talk about the special quality—*the personality*—of the new bank. I wonder how we could summarize it?

BURGIN: Well, we both believe in personal service, Dick. I mean continuing personal service—service that springs from a really genuine interest in every customer on the part of the individual who is serving him.

CHAPMAN:...Which really has to mean personal *responsibility*, too. The only personal service that counts for anything comes from a man who is free to make decisions on his own.

BURGIN: That's right. We've always tried hard to do that at The New England. Many of our officers have earned the right to make their own decisions—just as yours have.

CHAPMAN: So we're going right on with our old policies at the new bank. Personal service. Personal responsibility. And personal interest.

BURGIN: Yes, and don't forget that our new bank's staff of officers will be far larger than before ... which means a greater *depth* of service.

CHAPMAN: Why not add that we're a regional bank? Because we'll actually be working for customers in every section of New England.

BURGIN: A regional bank: you know, I like the sound of that. Let's add it all up. We have a common philosophy, we have the combined strength of The New England and The Merchants, and we have greater depth in men who can act for the bank in meeting the needs of our customers.

CHAPMAN: Yes, I like the sound of it, too... and I like the way our name reflects our regional interest: the New England Merchants National Bank.

NEW ENGLAND MERCHANTS NATIONAL BANK 28 STATE ST., BOSTON, MASS. MEMBER F.D.I.C.

Books

(Concluded from page 34)

Technical Books

NEW, specialized books likely to be of especial interest to M.I.T. Alumni include:

American Strategy for the Nuclear Age, edited by Walter F. Hahn and John C. Neff, with contributions by Ellis A. Johnson, '28, Professor Walt W. Rostow of M.I.T., and many others (Doubleday Anchor Original paperback, $1.45).

Basic Data of Plasma Physics, by Sanborn C. Brown, '44, Associate Professor of Physics at M.I.T. (The Technology Press of M.I.T. and John Wiley & Sons, Inc., $6.50).

The Control of Multivariable Systems, by Mihajlo D. Mesarovic, a Sloan Foreign Post-Doctoral Fellow in the School for Advanced Study at M.I.T. in 1958-1959 (The Technology Press of M.I.T. and John Wiley & Sons, Inc., $3.50).

Hummingbirds, by Crawford H. Greenewalt, '22, Life Member of the M.I.T. Corporation (Doubleday & Company, $22.50).

Nutritional Evaluation of Food Processing, edited by Robert S. Harris, '28, Professor of Biochemistry of Nutrition at M.I.T., and the late Harry von Loesecke, formerly of the U.S. Department of Agriculture (John Wiley & Sons, Inc., $12).

The Ups and Downs of Common Stocks, by George A. Cowee, '11 (Vantage Press, $3).

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TRANSMITTER DESIGN ENGINEERS
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PRODUCT DESIGN ENGINEERS
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Individuals Noteworthy

(Concluded from page 10)

New Posts

NAMED in the news recently were the Alumni whose elections, promotions, and appointments are reported below:

Conrad E. Ronneberg, '22, and *F. Philips Pike, '36,* as Program Directors, respectively, in the Division of Scientific Personnel and Education, and in the Mathematical, Physical, and Engineering Sciences Division, National Science Foundation . . . *Hugh S. Ferguson, '23,* as a member of the Corporation, Museum of Science, Boston . . . *Edward H. deConingh, '25,* as Campaign Chairman, Greater Cleveland's United Appeal for 1961;

Harold C. Harsh, '34, as General Manager, Ansco Division, General Aniline & Film Corporation, Binghamton, N.Y. . . . *David D. Terwilliger, '35,* as Chief Engineer of Systems, Precision Products Department, Nortronics Division, Northrup Corporation . . . *Brigadier General Austin W. Betts, '38,* as Director, Division of Military Application, Atomic Energy Commission . . . *John A. Easton, Jr., '36,* as Assistant Vice-president, The Singer Manufacturing Company;

Mrs. G. Lynde Gately, '41, as Director, Division of Health Information, Massachusetts Department of Public Health . . . *Norman C. Michels, '41,* as Vice-president, Facility Planning and Appropriations, United States Steel Corporation, Pittsburgh . . . *Edward G. Sherburne, Jr., '41,* as Head, Program to Improve Public Understanding of Science, American Association for the Advancement of Science;

Herbert H. Howell, '42, as Vice-president, Arthur D. Little, Inc., Cambridge, Mass. . . . *Lloyd E. St. Jean, '42,* and *Russell B. Hawes, '49,* respectively, as General Manager, Plainview, Long Island Plant, and as Manager of Operations, Advanced Systems Laboratories, Burlington, Mass., Sanders Associates, Inc. . . . *Peter G. Volanakis, '42,* as a Director, Strathmore Paper Company, Springfield, Mass.;

Robert S. Reebie, '43, as Director of Industry Planning, New York Central System . . . *Walter A. Jaeger, '44,* as Director, Facility Planning, American Hardware Corporation, New Britain, Conn. . . . *Richard C. Mulready, '46,* as Chief, Advanced Technology, Pratt & Whitney's Florida Research Center . . . *Donald M. Black, '47,* as Manager, Development and Market Research, Diamond Alkali Company, Cleveland, Ohio;

Colonel Sears Y. Coker, '47, as Commander, 151st Engineer Group (Combat), Fort Benning, Ga. . . . *Robert O. Bigelow, '49,* as Engineer of Studies, New England Electric System, Boston . . . *Robert L. Titus, '50,* as Vice-president, Sales, Anchor Manufacturing Company, Manchester, N.H. . . . *Joseph H. Holloway, '52,* as Manager, Resonance Physics Research, Bomac Laboratories, Inc., Beverly, Mass.;

Samuel J. Davy, '58, as Director, Engineering, National Company, Inc., Malden, Mass. . . . *Victor J. Lombardi, '58,* as Assistant to the President, Scott & Williams, Inc., Laconia, N.H. . . . *Robert C. Sprague, Jr., '58,* as Senior Vice-president, Industrial Relations, Sprague Electric Company, North Adams, Mass.

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Regularly priced 75.00 and 85.00

THE COOP

3-MONTH PAY-PLAN

Life's Molecules and Cells

(Concluded from page 23)

bone marrow should shed light on the general problem of enzymatic protein biosynthesis.

Work on the nervous system ranges from that done with a single nerve cell of a squid to studies of the brain of man. Of the small molecules in squid axoplasm 95 per cent, including some peptides never before discovered, now have been identified. The possible role of these chemicals as well as proteins in nerve conduction is most intriguing. At a higher level of organization, it is possible, by piercing single cells of the spinal cord or brain of the cat with microelectrodes, to record electrical currents associated with activity in the sense organs. By using recordings of single nerve fibers, one can now study the biophysics of stimulus and response for olfaction, skin sensation, vision, and audition. In the case of the eye, it seems that the retina does not transmit to the brain a simple mosaic of the outside world, but extracts critical aspects of events and transmits these along private nerve systems. Collaboration with the Communications Center is furthering progress in many of these studies of the sense organs and nervous system.

Microbiology

The newly formed microbiology group at M.I.T. is focusing its attention on the mechanisms whereby viruses infect the living cells of bacteria and mammals. This group is studying the mode of multiplication of the virus and its influence upon the metabolism and the genetics of the host cell. Coupled with these studies is an investigation of enzyme systems in micro-organisms. Enzyme syntheses and feed-back mechanisms that control the activity in bacteria and molds are being related to nucleic acids and the activators and repressors of enzymes in the living cell.

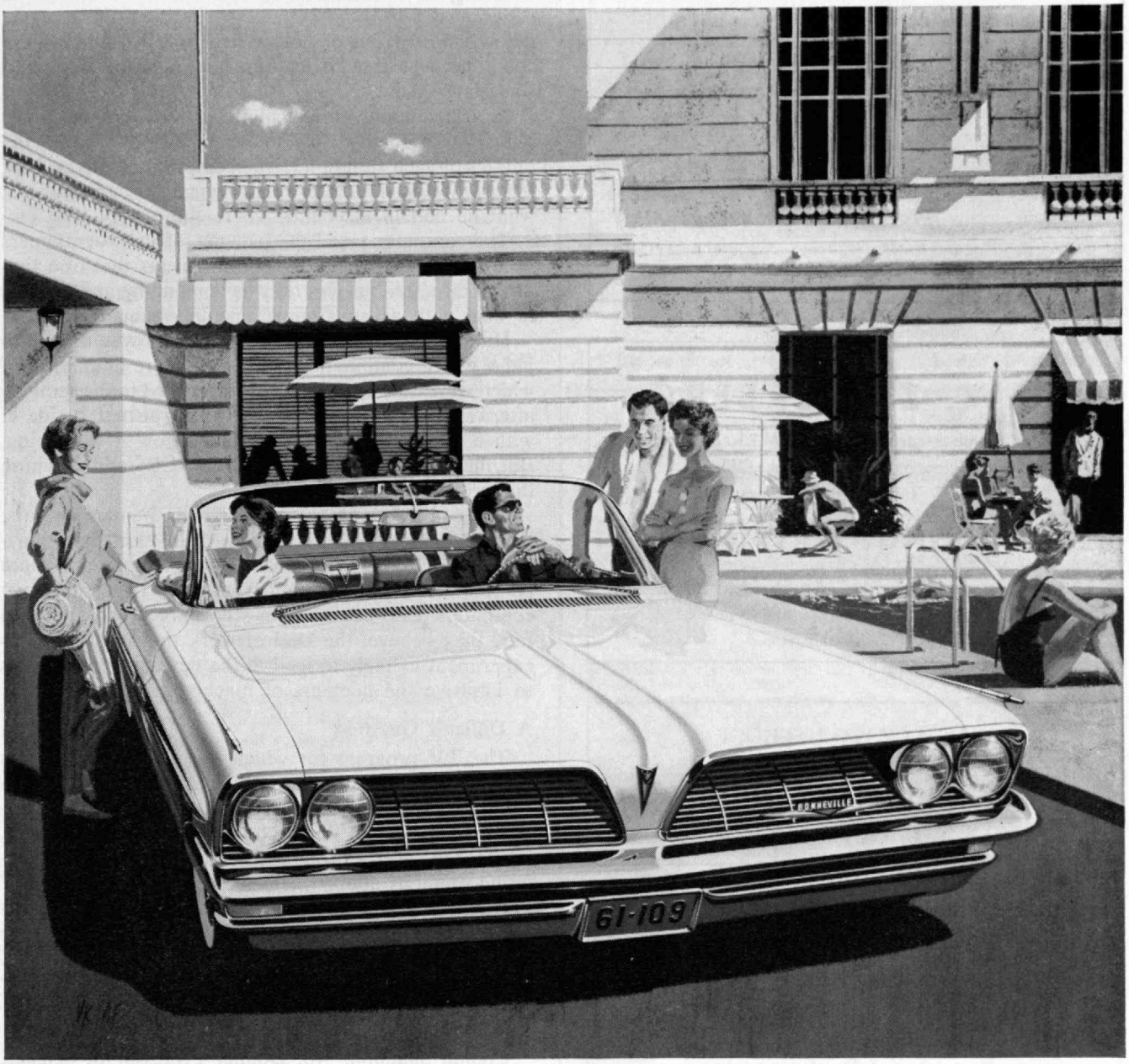
Bacterial viruses are of special interest to those biologists who are examining the genetic mechanisms of virus duplication and the relationship of a virus to the genetic elements of the bacterial host cell. Once a virus has infected a bacterium, the virus may become adapted to the bacterium by becoming fixed as a provirus, and its genes may cause changes in the host cell. In addition, bits of bacterial chromosomes may be incorporated into the virus DNA and be transferred from one bacterial cell to another by the virus. These acquired bacterial genes may be fully functional without affecting the behavior of the intrinsic viral genes. Similarly, in certain types of virus-induced cancer the viruses act as agents of genetic transfer to the cancer cell rather than directly as destructive parasites of the cell. It appears that a virus may directly control enzymes of a host cell and thereby modify its behavior. The growth of polio virus in tissue culture of cancer cells has provided a technique for studying the biosynthesis of an animal virus containing RNA. Interest in both animal and bacterial viruses is being centered on the genetic mechanisms associated with cell infection and disease.

How metabolic processes are regulated in a single microbial cell is being studied from several points of view. Attention is focused upon enzymes with reference to feed-back control of their biosynthesis by metabolites which they produce. For several enzymes, repressor molecules have been discovered; these interfere with the ability of the cell to manufacture enzymes. It is now possible to study enzyme biosynthesis in cell fragments and to demonstrate enzyme repression in nonliving systems. Genetic factors that play a role in enzyme synthesis and repression are being investigated with reference to RNA in the ribosomes, the seat of protein formation in the cytoplasm of the cell.

The Future

Biological research at M.I.T. will doubtless continue to be concentrated on molecular and cell biology. Important molecules in protoplasm will be isolated, identified, characterized, and their role in life determined. Special attention will be devoted to DNA and RNA and the genetic machinery for information storage and transmission to the next generation. Relations between cells at a higher level of organization will be studied in respect to growth and development as well as integration of the nervous system with the sense organs. The investigators will continue their collaboration with medical research workers, moreoever, so that this fundamental knowledge ultimately will be applied to the prevention and cure of disease and for the welfare of mankind.

NEXT MONTH: Professors F. W. Billmeyer, Jr., and A. S. Michaels, '44, will discuss the place of Polymers in Materials Science in a Technology Review article.



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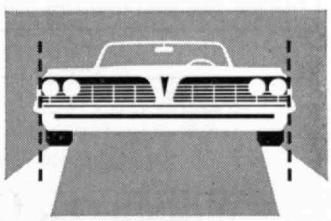

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Writing a Western

(Concluded from page 24)

fellow who was hit obviously had to fall dead, but the computer was free to let him have a drink first, and sometimes did.

A vast amount of logical machinery and programming was needed simply to keep track of things (the physics of each situation). The computer had to be kept from ignoring, in other words, where a character was, what he had in his hand, where the money was, etc.

The computer taxed the patience of its programmers in different ways than a person might tax that of a theatrical director, but was fully as demanding and difficult to deal with as any temperamental, human writer.

Having no horse sense of its own, it was unable to judge which combinations of actions were dramatic and which were dull. Perhaps, Ross suggested in the seminar afterwards, a man could have been seated beside it with a joy stick to tell the machine how it was doing. But there was no time for that, and CBS editors chose the scripts that went on the air.

Like many editors dealing with human authors, Ross and Morse often wished their electronic playwright were more co-operative, more affable, and more considerate of them. Quite possibly, they say now, computers can be made to seem more reasonable. In fact, they believe, the kind of work that went into this experiment is likely to lead to the development of ways to improve the manners of machines.

A Difficult Question

The TV program for which the western scene was written by the TX-O was entitled "The Thinking Machine," and in the course of it Jerome B. Wiesner, Director of the M.I.T. Research Laboratory of Electronics, introduced several of his colleagues who expressed differing opinions about whether machines "really think."

Oliver Selfridge, '45, of Lincoln Laboratory, for example, said that he is convinced that "machines can and will think."

Patrick Wall, Professor of Physiology, on the other hand, said that he is "not at all convinced yet that machines can think."

Claude Shannon, '40, Donner Professor of Science, reviewed some of the things machines have done, and concluded: "What we would like to see in the future is a more general computing system capable of learning by experience and forming inductive and deductive thoughts. This would probably consist in three parts:

"1) Sense organs akin to the human eye or ear whereby the machine can take cognizance of events. . .

"2) A large, general-purpose flexible computer programmed to learn from experience, to form concepts, and capable of doing logic.

"3) Output devices in the nature of the human hand, capable of allowing the machine to make use of the thoughts that it had, of the cognizant processes in order to actually affect the environment.

"Work is going on in all of these fronts simultaneously and rapid progress is being made. I am confident that within a matter of 10 or 15 years, something will emerge from the laboratory which is not too far short from the robot of science-fiction fame. In any case, this is certainly one of the most exciting and challenging branches of modern science."

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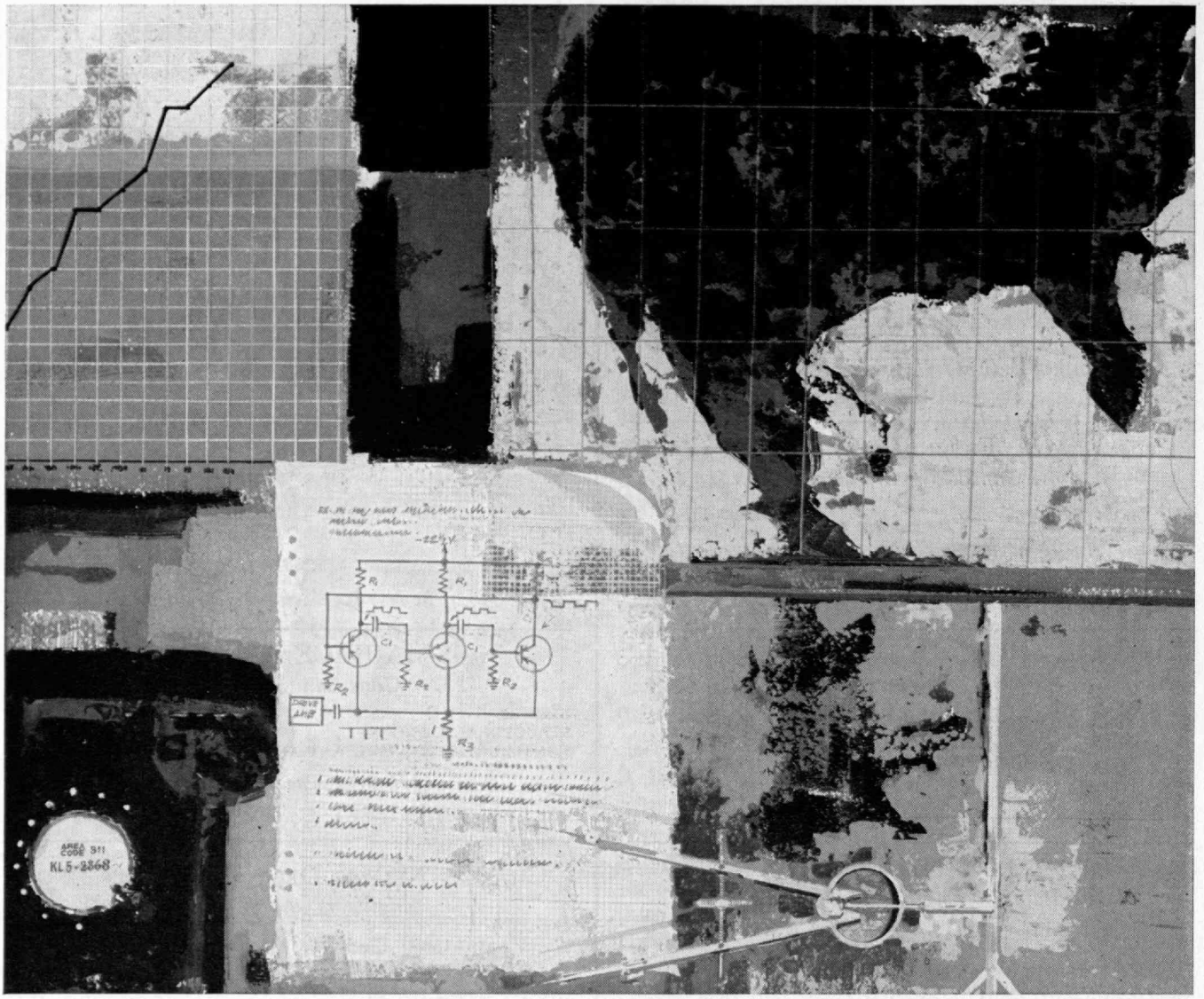

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Club Notes

Alvino Manzanilla Becomes President of Mexico Club

The M.I.T. Club of Mexico City honored outgoing officers Nish Cornish '24 and Gus Valdez '25 with a cocktail party at the home of the club secretary on November 17. H. E. Lobdell '17 wired his congratulations and Emmons Whitcomb '11 attended as special ambassador from the Alumni Council.

New club President Alvino Manzanilla '31 presented Mr. Whitcomb with M.I.T. steins, *estilo Mexicano,* and included a warm invitation to return to Mexico City for our Thirteenth Annual M.I.T. Fiesta in Mexico, to be held from March 9 to 11. To celebrate the Centennial Year, the Fiesta committee has planned an outstanding program.

Other visitors to our club were Mr. and Mrs. Loring Lee '51, of Bogota, Columbia, and Jerry Fahringer '54 of Boston. Local members in attendance were: Mr. and Mrs. Herb Brach '42; George Camp '16; José Calvo '33; Lyman Chandler '31; Miguel Amezaga '24 and his daughter, Mrs. de la Portela (new members from Cuba); Mr. and Mrs. Augustin Valdez '25; Mr. and Mrs. Clarence Cornish '24 and daughter, Vicky; Mr. and Mrs. Guillermo Lopez-Herrera '47; Mr. and Mrs. Fernando de la Macorra '23; Thomas Nevin '24; Armando Santacruz-Baca '54; Mr. and Mrs. Miguel Santalo '54; Mr. and Mrs. Emilio MacKinney '31; Enrique Curiel Benfield '43; Mr. and Mrs. Ray Danon '58; Erwin Anisz '42; Angel P. Moyano '42; Mr. and Mrs. Bill Osborne '47; Mr. and Mrs. Tufic-Antonio Chemor '31; and Arturo Morales Dominguez '44.

For advance Fiesta reservations write to: James J. Rattray '48, Secretary, Monte Everest 905, Mexico 10, D.F.

Robert C. Wood Speaks To Atlanta Alumni

The M.I.T. Atlanta Alumni Association held its fall meeting November 28, 1960 at the home of the president, Fred N. Dickerman '30. We were privileged to have as guest speaker Robert C. Wood, Associate Professor of Political Science at M.I.T. Dr. Wood chose as his subject "Suburbia: Its People and Their Politics."

In addition to the speaker, those attending were: Mr. and Mrs. Ralph E. Bartera '58, Mr. and Mrs. Roger Allen '27, Mr. and Mrs. Earle Blount '28, Mr. and Mrs. Zach S. Cowan, Jr. '44, Mr. and Mrs. William Huger '22, Mr. and Mrs. Fred Dickerman '30, Mr. and Mrs. Elmer Sanborn '22, Mr. and Mrs. Bill Shuler '38, Mr. and Mrs. John Turci '50, Glenn D. Jackson '55 and Merlyn E. Richardson '34.—William T. Shuler '38, Secretary, 4423 Mt. Paran Parkway, NW, Atlanta, Ga.

Change of Officers For Puget Sound Club

The first meeting of the season for the M.I.T. Club of Puget Sound was held at the Seven Nations Restaurant on Thursday, December 8, with over 100 Alumni and friends in attendance. The evening's speaker was Mr. Charlie Frisbie, a well-known sailboat enthusiast, who recently returned from a two-year cruise on his sailboat, *Alatola.* Mr. Frisbie's tales and his humorous manner of telling them will long be remembered by those present.

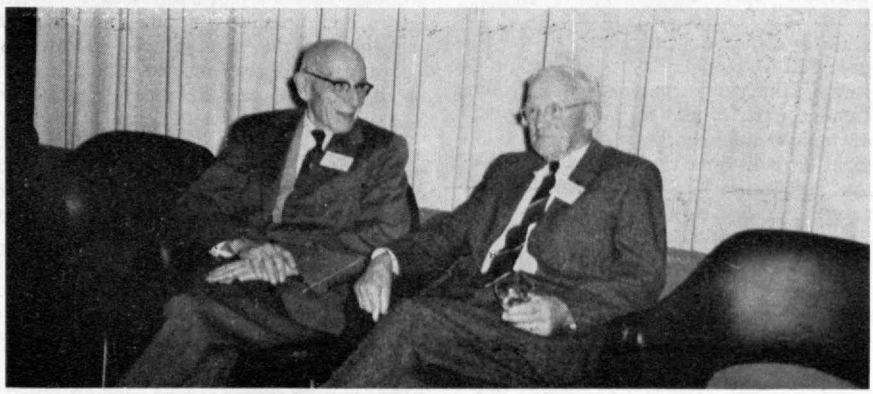
New club officers nominated and elected by the club at this meeting were: Arnold G. Gangnes '46, President; Edward W. Kimbark '33, Vice-president; William J. Sullivan, Jr. '51, Secretary; and Steven D. Simon '58, Treasurer. Outgoing officers released with a vote of thanks were: Harry A. Carter '42, President; Russell E. Winslow '40 and Richard T. Burke '50, Vice-presidents; Fred I. Fickenwirth '52, Secretary; and Andrew Hengesteg '55, Treasurer. Most of these former officers are now busily engaged in Second Century Fund activities.—Fred I. Fickenwirth '52, Secretary, 8314 19th Ave., NW, Seattle 18, Wash.

Club of Washington Plans Centennial Celebration

The executive committee met to plan the M.I.T. Centennial Celebration for the Club of Washington on February 9. It was decided to hold a dinner meeting with a prominent speaker, preceded by a reception featuring a visual display showing the growth of M.I.T. during its first 100 years. It is hoped that we may obtain a combination pictorial and model exhibit to display for the guests. The dinner is being planned for 300 people.

The Christmas luncheon-meeting on December was a fine opportunity for high school seniors to meet M.I.T. undergraduates. Gary Gillum '60 and William Strauss '60 told us about life at the Institute this year. Thomas Meloy '17 was the featured speaker.

William R. Ahrendt '41, President of the M.I.T. Club of Washington, has accepted a position as Visiting Professor of Instrumentation at the National University of Lima, Peru. We will miss Bill Ahrendt and the fine work he has done for our club. Good luck, Bill.—Gilbert H. Lewis '51, Secretary, 9914 Grayson Avenue, Silver Spring, Md.



L. F. Miller '01 and Col. R. S. Beard '05 converse at Northern California meeting.

Women's Association Hears Interesting Speakers

In the fall of 1961 the M.I.T. Women's Association presented two most interesting and informative programs. On November 1, Mr. Alfred Duca spoke on "Foam Vaporization: A New Technique of Art Casting." Before the lecture a steak supper was served in the Metals Processing Foundry Laboratory and after the lecture we returned to the Foundry to see a demonstration of the new method of casting. Over 70 members and guests attended this meeting.

On December 1, Professor Stanley Backer '41 spoke about "Textiles in the Space Age." This dinner-meeting was held at the Faculty Club. Hot punch and gaily decorated tables made this a very festive occasion. Professor Backer's talk ranged from a discussion of wash-and wear dress materials to space suits and parachutes for space capsules. A long question period followed.—Anna Bailey '54, Recording Secretary, 69 Columbia Street, Brookline 46, Mass.

Arthur Kantrowitz Speaks To Boston Stein Club

The Boston Stein Club, an Alumni group of M.I.T., held a dinner-meeting Thursday evening December 1 at 6:30 p.m. at the Faculty Club on Memorial Drive. The speaker was Dr. Arthur Kantrowitz, who discussed space age technology. Dr. Kantrowitz is Vice-president and Director of the AVCO Corporation and Director of the AVCO-Everett Laboratory. He was a Visiting Professor and Fellow in the School of Advanced Study at M.I.T. in 1958, and has been a Fulbright and Guggenheim Fellow at Cambridge and Manchester Universities. He is a Fellow of the American Academy of Arts and Sciences.

New members are wanted! In order to expand Boston Stein Club's services to M.I.T. we are entering an enlarged program to attract members. Your assistance is needed. Contact fellow Alumni. Let's make this program a success.—Norman R. Gardner '53, Corresponding Secretary, 100 Memorial Dr., Cambridge 42, Mass.

Chicago Alumni Club Observe Centennial

The M.I.T. Club of Chicago is planning a large celebration in honor of Tech's 100 years. The party is to be February 24 for Alumni, wives, children (if they're big enough!) and guests. It is to be held at the Furniture Club on the 18th floor of the Furniture Mart, 666 No. Lake Shore Drive, Chicago, and will include an interesting talk by George R. Harrison, Dean of the School of Science. There will be cocktails before dinner accompanied by music, and dancing after dinner with music by a very fine German band.

There will be tables of eight and we urge the membership to get up individual parties of Alumni and friends and reserve your tables now. Tariff is $8. per person and includes everything except cocktails. The dinner will be a very special and unusual New England dinner featuring an individual lobster per person, plus other seafood items. Members and guests of Milwaukee and Indianapolis Clubs are invited, and any others who plan to be in Chicago on February 24. Address all inquiries and reservations to Harlan H. Davis '40, 1201 Lawnmeadow Lane, Naperville, Ill.

On October 15, fifty members of the Club of Chicago were guests of the Illinois Bell Telephone Company at their 11-story Chicago Long-Distance Dialing Center. After dinner we toured in groups of ten. In addition to watching the efficient long-distance operators we observed the automatic "5 tone" direct long-distance dialing equipment. On another floor equipment automatically checks the communications equipment as well as all circuits, printing records of tests and trouble. The top floor radio room has 38 channels which among other things handle all network picture transmission for television. Another section handles automatic message accounting by five passes of punched tape and computers. Power supply units with stand-by batteries and diesel-electric generators were visited. The trip was extremely interesting and the complex operations were very well explained.

On December 15 the directors met at the Chicago Yacht Club as arranged by our able and genial President Dutch Seifert '19.—Warren J. Meyers '41, Secretary, 4220 West Belmont Avenue, Chicago 41, Ill.

James R. Killian Speaks to New Yorkers

In keeping with the M.I.T. Centennial the M.I.T. Club of New York has several highlights for 1960-1961.

On December 13, James R. Killian '26 was guest speaker at the club's traditional Silver Stein Dinner. Duncan R. Linsley '22 was awarded the Silver Stein for decades of dedication. Mr. Linsley is a life member of the M.I.T. Corporation and was a principal participant during the 1950 mid-century fund raising campaign. James A. Lyles '27 presented the award to Mr. Linsley. Malcolm Fleming '33 was chairman of the combined dinner-dance, taking care of all details both prior to and during the evening. Mr. Killian, advisor to the White House on scientific matters during his leave from the Presidency of M.I.T. and prior to becoming Chairman of the M.I.T. Corporation, spoke to the guests on "Making Science a Vital Force in Foreign Policy."

In the suburban sections, Long Island has a beer party scheduled for March and an annual dinner for April 21. Dr. Augustus B. Kinzel '21 will be the guest speaker. Last spring Dr. Kinzel spoke at the club's annual meeting for the election of officers in New York and delivered one of the outstanding talks of the season on "Science and the National Scene." In Westchester plans are being readied for the annual spring meeting at the Scarsdale Country Club.

Highlighting the year, a successful prewinter beer party was held at the Seventh Regiment Armory on Park Avenue. Dave Springsteen and Jack Preschlack, both from the Class of 1954, put the affair across. This month, February, is the kick-off date for the Management Orientation Program, being handled by Robert Morgan '55 who has spent almost 10 months of careful, comprehensive planning. The meetings will begin with a dinner at 6:00 p.m., followed by a lecture and question period. The schedule includes eight management topics: Industrial Management, Principles of Organization, Group Relations, Production Management, Fiscal Policies, Marketing, Labor Relations and Operations Research.

Plans for group travel abroad should materialize either next month or in the early spring, according to most recent reports. Well over 100 club members have indicated their interest in a chartered plane to Europe.

The Club Newsletter has been expanded this year to regular monthly six-page issues. Credit for the publication and its fine work in keeping almost 1500 Alumni club members posted goes to E. Arthur Hungerford '33, Editor, and to Edward S. Goodridge '33, President, George H. Ropes '33, Westchester section; and A. Ralph Krenkel '46, Long Island section.—James M. Margolis '52, 5 Fenton Street, Rye, N.Y.

Dr. Nicholas J. Grant Visits Club of Virginia

The fall meeting of the Club of Virginia, held on November 17 at the Commonwealth Club, was attended by Alumni, wives and guests. The following new officers were elected for the coming period: Garland S. Sydnor, Jr. '49, President; Carson L. Brooks '35, Vice-president; John H. Wright, Jr. '47, Secretary; William F. Bennett '35, Treasurer.

Mr. Sydnor expressed the thanks of the group for the fine job done by Christian E. Grosser '32, retiring President. Mr. Brooks reported that a fine crop of prospective M.I.T. students was being processed as part of the activities of the M.I.T. Educational Council.

The speaker of the evening was Dr. Nicholas J. Grant '44, from the Department of Metallurgy at M.I.T., who spoke on "Russia—Three Years Later." Dr. Grant showed part of his outstanding collection of color slides taken in Russia. He also discussed the contrasts in Russian progress as they are pictured in our press and as they actually exist. Dr. Grant had visited Russia as part of a team from Corning Glass Works to view the glass industry.—John H. Wright, Jr. '49, Secretary, 803 Baldwin Road, Richmond, Va.

The Emeriti Professors Hear Centennial Plans

Twenty-eight of the group of emeriti professors came to their annual fall luncheon December 7 in the Emma Rogers Room at M.I.T. After a brief "you don't change a bit" and other reminiscing, a nice luncheon was home-prepared by Mrs. Parsons. Then, John E. Burchard '23 in his informal and inimitable manner explained the plans for the Centennial Celebration. Elder statesmen attending were Professors Charles E. Fuller '92, Samuel C. Prescott '94, Joseph C. Riley '98. And so down to two "freshman" emeriti Professors C. Fayette Taylor '29 and Samuel D. Zeldin (Clark 1917).—Shatswell Ober '16, Room 33-303, M.I.T.

Deceased

CHARLES W. POWER '89, June 9
EDWARD S. PAGE '93, November 12*
FREDERIC M. KENDALL '98, November 8*
H. RUSSELL SAWYER '99, November 21*
FRANCIS G. FRINK '00, August 29*
GEORGE H. LLOYD '02, May 17
JAIME GURZA '03, May 11
HERBERT C. MERRILL '03, October 7
CHARLES R. HAYNES '04, November 21*
NATT M. JOHNSON '04, October 31*
WALDRON P. SCHUMACHER '04, Aug. 11*
WILLIAM J. SNEERINGER, JR. '05, Aug. 21*
CLARENCE E. TUCKER '06, November 24
CLARENCE D. HOWE '07, December 31
WILLIAM F. KIMBALL '07, November 23*
CHARLES C. BENTON '08, October 25
RAE W. DAVIS '08, October 20
HELEN LONGYEAR PAUL '09, October 30
JOHN L. WILDS '11, November 30*
STRATHY R. MACKELLAR '12, October
PHILIP M. HAMILTON '13, August 2*
HARRY S. PARKER '13, August 8*
CHARLES T. BARNARD '17, Nov. 7, 1959*
BRIAN CURTIS '17, September 5*
RALPH D. BOOTH '20, November 21*
CHARLES B. MEYER '20, no date given*
ROBERT E. GUTHRIE '21, October 31*
WILLIAM K. MACMAHON '22, Nov. 20*
PAUL A. HEYMANS '23, November 19*
SYDNEY G. WALTON '23, December 4*
GEORGE F. WAY, 3RD '24, no date given*
WILLIAM L. CARROLL '25, December 5*
ALFRED J. GOVONI '26, November*
NUNZIO J. SAPIENZA '26, no date given
CARL J. KOHLER '28, November 14
EDWARD W. SANN, JR. '33, June 15
JAMES C. RHOADS '34, in 1959
JOHN H. WOOD '34, August 24
THOMAS MCELRATH '40, November 6*
WILLIAM P. READY '40, May 24*
JACK DINERSTEIN '54, August 6
PAUL E. HOWICK '58, July 30
MICHAEL J. POLLOCK '59, Nov.
*Further information in Class Notes

Class Notes

'92

In my Class Notes on the Alumni Meeting last June I stated that I was the only member of the Class of '92 present. I recently received a letter from **Wesley Halliburton** of Memphis, Tenn., stating that he was present but failed to contact me. The following is an extract from his letter: ". . . Too bad! I was in attendance and in residence on the campus from June 7 to June 14, having a room in the Graduate House Hall for men. I tried to contact you by enquiry on arrival but I failed. I spent five days walking over the campus and through the buildings and was tremendously impressed. One day I devoted to Harvard and one to Boston. I have always loved the sciences, and I was filled with nostalgia as I rambled through classrooms and laboratories and libraries that brought recollections of my five years in the study of the sciences—four at Vanderbilt and one with you. I left M.I.T. in May, 1892, to go to the Phoenix Bridge & Iron Co., at Phoenixville, Pa., to become a draftsman in their engineering office. Being reared in open plantation life I wearied of the circumscribed life in a drafting room and after three and a half years of it, I resigned and returned to the freedom of the open country near my present home in Memphis. Gradually, I became interested in speculating in farm lands and for most of these years I spent my time in buying large tracts of two or three thousand acres and subdividing them and selling them in small tracts—40 or more acres. It was profitable, constructive, and out in the open most of the time. I retired (no one but myself and a secretary were involved) in 1940 at age 70. During all these years I have traveled much.

I've been married once and lived with my wife over 58 years. Two sons were born to us. Richard, who became well established as a travel writer and lecturer, was lost in the Pacific Ocean at age 39. Wesley, Jr., passed away at age 15. I am traveling most of the time now. I spent two and a half months last winter in Peru, and shall go to Egypt for similar time in January next, seeking warm, desert climates. I have had a splendid, active, profitable life and have made, I'm sure, a creditable name for myself in my home city where I have lived 61 years. . . . I am sorry I missed you last June. I may not come that way again. With best wishes."

The Editor of The Review has sent me a copy of the following letter from Mrs. Alice M. F. Newkirk, widow of our classmate, **Walter M. Newkirk**: "In the November 1960 issue, there is a new tabulation (Institute Yesteryears) about happenings in the past. I am, therefore, asking you to tell me the date of the first large reunion of the Alumni meeting to discuss the Harvard offer of money left to Harvard College for an engineering school. I vividly recall that meeting, which I attended with my husband, in the early years of our marriage in Detroit before we came to Philadelphia. Here, he became connected with a company that was noted for the manufacture of carriage springs, but which had attempted to use them without success on automobiles. Consequently, my husband made an extensive research about springs for automobiles and became known in the Society of Automotive Engineers and Society for Testing Materials as 'the Grandaddy of the Spring Business.' My husband invented a fitting machine that cut down labor costs for the company of which he was vice president and general manager. For many years, before General Motors built its own spring shop, the company manufactured and designed all the springs for the Packard Company and half of those for the Cadillac of General Motors. (All were designed by my husband.)

Candle Count

GODFREY L. CABOT, '81, will become the only centenarian on the Alumni Association Honor Roll when he celebrates his 100th birthday on February 26. Congratulations to him and to the two Alumni who will turn 90, six who will become 85, and six who will be 80 this month. Their names are listed below with dates of birth.

February, 1871—MARION L. GRIFFIN '94, on the 14th; and EDWARD M. HUNT '94, on the 20th.

February, 1876—FEDERICK A. JONES '98, on the 2nd; EVERETT O. EASTWOOD '02, on the 5th; CHARLES H. POPE '97, on the 10th; FRANCIS M. BINGHAM '99, on the 15th; FREDERICK C. GILBERT '98, on the 18th; LEROY H. BYAM '98, on the 29th.

February, 1881—GEORGE E. LOCKE '02, on the 1st; LOUIS B. RAPP '03, and ARTHUR E. SPENCER '05, on the 3rd; HARRY S. PERCIVAL '05, on the 13th; HAROLD OSBORN '03, on the 19th; WALDO TROWBRIDGE '04, on the 26th.

"In the note by the Secretary of '92 in the November Technology Review, it was announced that Mrs. Herbert Kales, widow of Herbert Kales, President of the Class of 1892 at time of graduation, had died. This is a surprising statement to me, as **William R. Kales,** according to my husband, was the president of the class. He was a close friend of my husband in college and later, when both were living in Detroit. We went to Japan for the World Engineering Convention in 1949 with the Kales. I knew him as Billy Kales. After his death, his family gave the Eye Clinic to M.I.T. I saw it when I visited Boston on my way home from a summer at Northeast Harbor, Maine. I never heard of a Herbert Kales before the note in Technology Review. The secretary reporting must have been confused." There was a mistake in the note received by the secretary, apparently. It was William R. Kales who was class president.—**Charles E. Fuller,** Secretary, P.O. Box 144, Wellesley 81.

'93

Edward Samuel Page died at his home in Melrose on November 13. He had been a practicing attorney with the firm of Wellington and Page for many years and was also proprietor of the M. S. Page Company of Boston, wholesale jewelers. Mr. Page prepared at Phillips Academy, Andover, and was a student in Course III at Tech. He then went to Harvard where he received an A.B. in 1895 and an LL.B. in 1897. He was a member of the Massachusetts Bar Association, Middlesex Harvard Club, Boston Jewelers' Club, National Association of Wholesale Jewelers, and was a past president and trustee of the Melrose Trust Co., a former Melrose alderman, a member of the First Congregational Church of Melrose and Wyoming Lodge, AF&AM. Mr. Page is survived by three daughters, a son, eight grandchildren and seven great-grandchildren.

'95

Last Monday, December 12, the worst blizzard on recent record hit the Boston metropolitan district with 16 inches or more. It snowed all day, tying up all traffic for three days, except where the main streets were plowed out. A check of our '95 Eighty Plus Club finds all of our members having come through without trouble. **C. Willard Bigelow** has returned to 23 Elm Street in Brookline after his usual summer at Ned's Point Road, Mattapoisett, Mass. . . . **John Dyer** is still at 636 Morris Street in Albany. . . . **Charles W. Berry** is at 1088 Massachusetts Avenue, Lexington. . . . **Luther Conant** is in Cambridge at 46 Shepard Street. Luther is a wonder! For five years he has been confined to the second floor of his home and yet is full of spirit. He telephones, and is interested in all the day's events.

Charlie Eveleth, P.O. Box 41, Concord, is confined at home but has his children and grandchildren to keep him interested. . . . **Ralph Lawrence,** 66 Stone Road, Belmont 78, who is also confined at home, completes the list of those in this district who made it through the blizzard.—**Andrew D. Fuller,** Assistant Secretary, 120 Tremont St., Boston, Mass.; **Luther K. Yoder,** Secretary, 69 Pleasant St., Ayer, Mass.

'96

Walter H. James of 17 Boxford Road, Topsfield, Mass., has, since his retirement from the faculty in Mechanical Engineering, devoted most of his time to his hobby

of woodworking. He still drives his car around town but never far from home. Having formerly been on the School Committee and Recreation Board in Waltham he probably continues to be interested in schools and playgrounds. Association with children is the most effective way to keep young. . . . **Edward L. Cadieu,** who was with us as a freshman before going to Tufts, died on March 5, 1958, as reported by the Alumni Association. He lived in Marblehead and was president of the Hercules Kalon Company of Lewis Wharf, Boston.—**James M. Driscoll,** Secretary, 129 Walnut Street, Brookline 46, Mass.; **Henry R. Hedge,** Assistant Secretary, 105 Rockwood Street, Brookline 46, Mass.

'98

We have the following new addresses for two of our classmates: **Lyman F. Hewins,** 2601 Woodley Place, Washington 8, D. C.; and **Arthur W. Huse,** 116 Wurst St., Elyria, Ohio.

It is an unpleasant duty to announce the passing of our classmate **Frederic M. Kendall** on November 8, 1960. The following obituary notice was clipped from the Boston Herald: "Frederic M. Kendall, 84, of 36 Adams Road, a retired architect and a veteran of the Spanish-American War, died Tuesday at Cushing Hospital. He was a native of Framingham and a graduate of Massachusetts Institute of Technology, class of 1898. He was associated with the Boston architectural firm of Peabody and Stearns for many years until his retirement 15 years ago. He was a member of the Boston Society of Architects and the American Institute of Architects and a member of Middlesex Lodge, AF&AM, for 57 years. He was a past master of the Masonic lodge and treasurer of Edgell Grove Cemetery trustees. He leaves a son, Edward F. Kendall of Palm Beach, Fla. Private funeral services will be held Friday at 2 P.M. at the Adams Road address."

In a memorandum issued from the office of The Tech Review, is the following bit of interesting information: "Class and Club Notes are the most important part of The Review to most of its readers. Last year these notes totalled more than 400,000 words," and the editors advise they are extremely grateful for all this reporting.—**Edward S. Chapin,** Secretary, Hotel Beaconsfield, 1731 Beacon St., Brookline, Mass.; **Frederic A. Jones,** Assistant Secretary, 286 Chestnut Hill Ave., Brighton 35, Mass.

'99

Everett Pierce has left Bath, Maine, and joined our southern group at 155 5th Ave. S., St. Petersburg 1, Fla. . . . There are three members of '99 on the honor roll of the 50 oldest alumni or rather alumnae: Miss **Henrietta L. Graves,** born 1862; Miss **Eugenia B. Frothingham,** born 1865; and Miss **Harriet Faxon,** born 1869. Never underestimate the power of a woman. . . . **H. Russell Sawyer** died November 21, 1960, at the age of 84. He was the owner of Sawyer's Hotel at Rye Beach, N. H. Russell was former state representative, a 50-year commissioner of the Rye Beach Precinct Commission, and the first secretary-treasurer of the Abenaqui Golf Club. During World War II he was manager of a government housing project in Kittery, Maine.

Miles received a very interesting letter from **Etheredge Walker** who lives at the Sheraton-Palace in San Francisco. He "retired by easy stages from 1946 to 1956 by cutting out first the duties that required rather arduous trips. I feel that I have had a very interesting life.". . . **Sherrill** and **Witherell** meet regularly at the Alumni Council; sometimes **Skinner** and **Kinsman** appear. Witherell has been treasurer of the American Association of Variable Star Observers for over 30 years. He is a life member of the American Astronomical Society, a Fellow of A.A.A.S., and several other societies. Trips to many conventions have made life interesting.—**Burt R. Rickards,** Secretary, 349 West Emerson St., Melrose, Mass.; **Percy W. Witherell,** Assistant Secretary, 84 Prince St., Jamaica Plain, Mass.

'00

The secretary's face is very red as he rectifies an error of omission in the Class Notes in the November 1960 Review. The name of **Stanley Fitch** was unaccountably omitted in the list of those present at our 60th Reunion. This is a particularly egregious error as, if my records are correct, Stan is the only member of the class who has attended every reunion that we have held.

Francis G. Frink died August 29, 1960. He lived in Seattle, Wash., and was an official of the Washington Iron Works which was founded by his father. Francis was a brother of **Gerald Frink** who graduated with us and died in 1956.—**Elbert G. Allen,** Secretary, 11 Richfield Road, West Newton 65, Mass.

'02

The company that **Dan Patch** has been connected with for 37 years, the Morton Tuttle Co., announced on October 25 last that it would cease operations immediately. A whole cargo of records, correspondence, and supplies was jettisoned but Dan salvaged a set of ship curves which he had made when he worked in the mold loft at Fore River and these he took over to the Naval Architectural Department at M.I.T. Dan also rescued from the waste basket a bunch of schedule sheets which he had developed during his years of work as a business expediter. It seems that when his company built the three United States Gypsum plants at Charlestown, Mass., Detroit, and Philadelphia, Sewall Avery became worried because he feared that if his non-union men started to install equipment as he wished to, while the Tuttle company was still building, his jobs would be struck and he could not get his product on the market as he had scheduled. So he went to Mr. Tuttle and asked him if for an additional fee of $10,000 on each job he would install the equipment. Mr. Tuttle told him he would take the job provided he could be assured that the equipment would be ready, and that Dan Patch would be the watch-dog. So Dan had the job of following design, requisitioning, purchasing, and expediting for all three jobs and commuted between Chicago and the three cities. He developed a method of schedule sheets at that time which was successful there and later on other jobs. He had a good supply of the sheets printed up and when he used them on a war job with the Quartermaster Corps in Washington they replaced his supply with some to spare. Dan says that if any young engineer would like to look at the sheets and have Dan go through the method of use with him and have them perform the services for which they were designed, he should call or write Dan at 26 Lincoln St., Stoneham 80, Mass.

Send in some news to the secretary.—**Burt G. Philbrick,** Secretary, 18 Ocean Ave., Salem, Mass.

'03

The first meeting of the graduation class of 1903 was held at the Union on the evening of November 6, 1903. It took the form of an informal dinner at which 22 members of the class were present. There was no regular program provided to follow the dinner. The fellows gathered around the piano and sang Tech songs. **Gerald Loughlin, I,** entertained them with solos. The next evening being Tech Night at the Columbia Theatre, a number of our classmates were present in a box which had been reserved for them.

Robert King, III, writes from his home in New Canaan, Conn., that he is now much better after a slight illness during the past year. He is still busy with problems in chemical manufacture and rubber investigations that will soon be related to us. He saw **Clarence Joyce,** V, at the M.I.T. Club of New York recently, and says he looks very fit. Joyce was with Du Pont for many years, was secretary of the American Chemical Society and was active in the Chemists Club of New York. Though Robert was unavoidably detained from the June, 1960 festivities, he eagerly looks forward to June, 1961.

An interesting note from an article on the present Rogers Building, by Welles Bosworth, '89, the architect, is worth noting: "I well remember Dr. Compton's writing to me, asking me to describe to him how I visualized the new Rogers entrance and vestibule to M.I.T. from Massachusetts Avenue, and my telling him there ought to be four statues of the great Greek founders of modern learning in it. He and I later agreed on

them as Aristotle for the Sciences, Archimedes for Engineering, Ictinus (and Callicartes looking over his shoulder at a plan of the Parthenon) for Architecture. Seeing these statues would certainly inspire every student and teacher of M.I.T. to follow their example and hope to become 'great.' The pier of masonry back of each statue was to bear incized outlines illustrating their inventions, like the water screw of Archimedes and the Parthenon of Ictinus, or famous words of theirs. What fine memorials these would make of distinguished M.I.T. graduates! The idea must be continually kept alive, and I hope you may find a way of bringing it somehow into print where the Alumni will see it."

On November 29, your secretary had the extreme pleasure of attending the M.I.T. dinner at the Faculty Club. It was the evening of a most severe rain and wind storm, but this never dampened the enthusiasm of a crowded audience. Many wives of the Alumni present enlivened the group which included old and young members. Seating at the supper table had no restrictions, and this happily enabled younger and older members to meet with the wider scope of M.I.T. interest. The fluent and embracing talk by Mr. Charles F. Adams, Chairman of the Board, Raytheon Company, entitled "Business Responsibilities in Massachusetts" held our interest to the end. It was followed by a series of charts on a screen that astonished us with the obstacles which all business corporations in our state have to overcome. Yet with their heroic patriotism they refuse the alluring advantages of moving elsewhere.—**John J. A. Nolan,** Secretary, 13 Linden Ave., Somerville; **Augustus H. Eustis,** Treasurer, 131 State St., Boston.

'04

We congratulated ourselves last month that we had no obituaries. This month we have three. We should have had our fingers crossed. . . . It was a real shock to hear from **George (Cap) Curtis** that **Charlie Haynes** had passed away on November 21 from cancer. George said Charlie had been best man at his wedding. Your secretary recalls that Charlie was one of his first acquaintances in our freshman year, for in the lectures when we were assigned seats alphabetically Hayden, Haynes and Hayward came together. We were all three present at our 50th and 55th reunions. Charlie was a loyal member of '04 and attended most if not all the reunions throughout the years. He was versatile and popular. Most of his professional work as a chemical engineer was connected with the rubber industry in which field he was well and favorably known. . . . Many of you will also have pleasant recollections of **Waldron Schumacher,** Course III, who died August 11, 1960 at El Paso, Texas. Waldron stayed at M.I.T. for a year after graduation as a private assistant to Professor R. H. Richards after which he took a position with the American Smelting and Refining Company in Mexico. After rising to the superintendency in their Santa Barbara unit he was transferred to a supervisory position in their El Paso office and continued there until retirement. Unfortunately he suffered a paralytic stroke about the time of his retirement, which curtailed his activities and prevented his attendance at our 50th reunion. . . . The alumni office reports the death of **Natt M. Johnson** at Northfield, Vermont, on October 31, 1960. We have no details at this time.

We are all aware by this time that M.I.T. is arranging a big celebration in April to commemorate the one hundredth anniversary of the granting of its charter. There will be various events to which alumni are invited and some classes are planning special meetings. Your president, treasurer and secretary have agreed that this would be unwise for '04 but the alumni office assures us that plans are being made to assign alumni not otherwise provided for to congenial groups of similar vintage. So come if you can.—**Carle R. Hayward,** Secretary, Room 35-304, M.I.T.; **Eugene H. Russell,** Treasurer, 82 Devonshire Street, Boston, Mass.

'05

You will be hearing from time to time of plans for M.I.T.'s Centennial Week, April 2 to 9, 1961, and many will plan to attend. We have to choose now whether we want a special '05 dinner on Saturday night (April 8) or to join with one or two classes adjacent to ours for a joint meeting. I talked it over with **Hub** (President Kenway) and we have tentatively lined up for the latter. However, if anyone wants to "start something" for a separate celebration, now's the time to speak up. I have been so over-optimistic so many times in predicting the views of my classmates that I will wait for such enthusiasm to come from the grass roots.

Gib Tower, XIII, reports that **Arthur E. Russell,** XIII, has changed his address from the Paradise Motel to the Pelican Harbor Motel, 7950 N.E. Bayshore Court, Miami, Fla. No news from Russell except that, as is his custom, he spends a good part of the summer visiting in New England. . . . I have received a Christmas News Letter (family) from the **Ted Steels** with the information that Ted spent some weeks in the hospital in 1956, and that now except for poor eyesight he is very well. . . . **Ted Moorehead** writes from Oakland, Calif., that he has had one cataract operation, expects to have another one within a year. He says, "I no longer drive a car. Other defects, though not too serious, have landed me in the hospital five times during the last four years."

Sid Caine writes that although he retired three years ago he usually has three services a week, two on Sunday. This summer he had his gall bladder removed and was out of the hospital in 10 days. "I feel 20 years younger, and 20 pounds lighter and full of energy."

In an attempt to get more of a story on **Ted Jewett,** whose death was reported in the November issue, I received this letter from **George Whiting,** I: "Since 1905 I have only come in contact with Jewett twice. **LeBaron Turner** and I were in New York on holiday sometime in the early 20's and we ran into Ted Jewett in the lobby of the theatre. There was only time for a few words with him. Later during the second world war Ted phoned me in Baltimore. I tried to arrange a meeting with him but for some reason it did not come off. . . . As for myself, I am still working as chairman of the board of The Whiting-Turner Contracting Company which LeBaron Turner (M.I.T. Course I, 1905) and I started in 1909. Old age is taking its toll of my activity—eyes and hearing not so good; however, I go to the office every day. I have two sons and one daughter and eight grandchildren. My children's mother died in the early 20's and I remarried in 1939."

Here is an extract from a letter from **Ernest Schmeisser,** VI: "As you know I graduated in E.E. with the class of '05. Then joined the New York Central and Hudson River R.R. in its electrification into New York City. The Pennsylvania R.R. was digging its two tunnels under the Hudson River and four tunnels under the East River together with its station in New York City. I joined the electrical department of the Penn Tunnel & Terminal R.R. Co., as assistant engineer on electrification. Then several years in my own engineering sales business. Now I am retired and living in Baltimore. Member of Engineers Club of Baltimore, Gibson Island Club, Baltimore Country Club and Hopkins Faculty Club. Mrs. Schmeisser and I travel occasionally. No children."

I have just learned that **William Sneeringer,** III, died at Riderwood, Md., on August 21, 1960. . . . Those of us who knew and had learned to love **Charlie Smart's** wife Effie through contacts at our Cape Cod reunions, will be shocked to know that she passed away suddenly while she and Charlie were visiting in Honolulu. I am sure I can express the cumulative sympathy of all his classmates to Charlie. I am sure he would be glad to hear from you personally: Charles E. Smart, 38 Maple Ave., Troy, N. Y.

We have had wonderful weather up here in the foothills of the White Mountains. I waited as long as I dared before putting my flowers, shrubs, etc., to bed for the winter. Finally did, but this morning I picked a bunch of pussy willows.—**Fred W. Goldthwait,** Secretary and Treasurer, Box 32, Center Sandwich, N. H.; **Gilbert S. Tower,** Assistant Secretary and Treasurer, 35 No. Main St., Cohasset, Mass.

'06

The Class Notes for last month should have included a report of the unusual meeting—the 347th—of the Alumni Council last October. Why unusual? Because four of your classmates were special guests, joining your regular representa-

tives, **Sherm Chase** for the Albany Club, and yours truly for the class. Dr. **Herbert Ball,** II, came down from Lowell where he continues to teach a few courses at Lowell Tech; **George Guernsey,** I, came in from Wellesley where, being retired from the Dana Hall Schools, he keeps in trim by knocking that little white pill around. **Tom Hinckley,** XI, and **Jim Kidder,** VI, completed the six for '06 and we had an enjoyable bull session before the dinner. About the same time in October **Andy Kerr,** VII, had reported that he was planning a trip to England to visit the museum in London in his quest for material for the history of Plymouth, as chairman of a committee entrusted with that assignment.

Then Andy added some information that takes us back into the last century for he and **Andrew Keleher,** VII, had served in the army in the Spanish War! Andy Keleher was in the 9th Infantry and was on the headquarters staff in the Philippines as a Spanish Translator. A.H. was born May 12, 1881 in Albany (died 3-14-44) so he was 17 years old on May 12, 1898. He had prepared at Eastern High School in Washington, D. C., and his home address, as given in our senior portfolio, was United States Army! Andy Kerr was a corporal in Co. E, 5th Reg. Mass. Volunteers 1898-99 and part of the time was at Mantinsin in Cuba with Dr. Walter Reed.

These notes are scanty, being compiled a few days after the autumn blizzard of December 13, with plenty of snow to shovel. Fortunately all my "winterizing" had been done. P.S. Return your questionnaire promptly to—**Edward B. Rowe,** Secretary-Treasurer, 11 Cushing Road, Wellesley Hills 81, Mass.

'07

Stan Wires has very thoughtfully sent to me a copy of the New England Architect & Builder for September, 1960. This magazine contains the final installment of a splendid article on "Decorative Tiles" which Stan has written. The entire article is profusely illustrated and well worth reading. If any of the men wish to read it, I will send the article to you upon request, only asking that it be promptly returned.

Another very interesting article was printed in "Aim" for Sept.-Oct., 1960. This magazine is published by Allstate Insurance Company. As I looked through the magazine, I found a full-page portrait of our classmate, **Jim Barker,** and on the opposite page, a fine article covering his years of activity with Sears and its insurance subsidiary, Allstate. Jim wrote me as follows: "Although I remain as a director of Sears, Roebuck and Co., and of the Allstate Insurance Companies, as well as of the Milwaukee Railroad, and of Universal Oil Products, I have decided to lighten my responsibilities." While Jim has now retired from active leadership in business, those of us who know him well will expect to find him keeping very active in some form of occupation that especially appeals to his capabilities. I give several quotations from the article in "Aim" which I know you will enjoy reading.

"An Allstate era has come to an end with the retirement of James M. Barker. . . . In the years leading to his retirement, James Barker taught that management can manage successfully only with the consent of the managed. He has held the view that management is essentially a teaching job involving not only instruction as to how work is to be better performed, but also educating men and women to give themselves the right orders. He has maintained that management is essentially a personal relationship that is mutually beneficial when a warm, personal understanding exists between the manager and the managed. . . . The mark of James M. Barker has been indelibly impressed on our history and in the records we have set, and though he leaves us as an employee, we can expect to learn from him and enjoy his friendship and counsel." . . . On behalf of the class, I extend a "well done" to Jim. We are most happy that '07 can claim him as one of its distinguished members.

A letter from Mrs. William F. Kimball told of the death of her husband, and our classmate, on November 23, 1960. **William F. Kimball** took Electrical Engineering, Course VI, and was graduated with the Class in 1907. He was associated for several years with Stone & Webster, Inc., and The Raytheon Manufacturing Company in Bedford, Mass. Bill was intensely interested in many electrical inventions, and the one into which he put his greatest efforts was the "Two Rate Meter" now being extensively used in power stations. Since his retirement, he has not been well and has been living in West Newton. He died suddenly of a heart attack and was buried in Woodstock, N. H. His wife, a daughter, and a grandson survive him. Your Secretary wrote to Mrs. Kimball, expressing our sympathy in the sudden passing of her husband.

Your secretary realizes that arduous duties must be performed by younger men, so he retired as chief of the Whitinsville and Northbridge Fire Departments on December 1, having served as an officer of the Whitinsville Department for 36 years and as Chief of both Departments for the past 14 years. After January 1, he will relinquish his duties as plant engineer of the Whitin Machine Works but will continue as a staff assistant to the President.—**Phil Walker,** Secretary and Treasurer, 18 Summit Street, Whitinsville, Mass.; **Gardner S. Gould,** Assistant Secretary, 409 Highland Street, Newtonville 60, Mass.

'11

The following notes regarding our 50th Year Reunion at Snow Inn, Harwichport, next June 9, 10, and 11, were received from Committee Chairman **Oberlin Clark,** 50 Leonard St., North Weymouth, Mass.: "I have just reread the log by **Jim Duffy** and looked again at the pictures in the 'Elevener' issued after our last reunion in 1956. They bring back memories of the glorious time we had then and lead me to look forward more than ever to the coming golden anniversary party. Next month you will receive the Spring, 1961, issue of the 'Elevener,' with a coupon to be sent in reserving rooms at Snow Inn for June. Attending the reunion will surely provide experiences that will become fond memories in the years to come. Let the Secretary or the Chairman hear from you, anyway."

Dick Ranger, VIII, President of Rangertone, Inc., Newark, N. J., was featured again in the "Newark Sunday News" last October for his installation of the Sound System in the St. James Theater on 44th St., New York City. Details regarding this installation were in our class notes in the February, 1960, Review. . . . The report on contributions to the 1959-1960 Alumni Fund, from Classes 1879 to 1959, shows the Class of 1911 highest in percentage of active classmates contributing, although it was only 65 per cent. We were eighth in the average individual contribution, and 16th in total amount contributed, which is not bad, considering the larger number of active members in the later classes. Let's try to make it even better for the 1960-1961 Fund, which closes June 30. . . . In the December, 1960, Review, **Gordon Wilkes,** II, P.O. Box 426, East Orleans, Mass., was quoted in the notes from M.I.T. retired professors. He and his wife have had a wonderful time during the past six years on Cape Cod, and are in excellent health. They have a small power boat and a small sail boat, and spend a good deal of time on the water during the summer.

Classmate **John L. Wilds,** II, of 205 Woodland Drive, Darlington, S. C., died November 30, 1960. No further details were received.—**Henry F. Dolliver,** Secretary, 10 Bellevue Rd., Belmont 78, Mass.; **John A. Herlihy,** Assistant Secretary, 588 Riverside Ave., Medford 55, Mass.

'13

Well, here we are again. Our first snowstorm is raging outside so we shall take advantage and bring you all up to date on what little news is available. **Gene MacDonald** writes, "I find a memo to myself that I owe class dues. I don't know how much but enclose a check on account. Best wishes to you and any of the mates you see." Thanks, Gene. Your brevity is refreshing. . . . We hear frequently from **Charlie Thompson.** He and his very nice wife, Ann, are quite the travellers. Last summer, they made several trips to Nova Scotia, Cape Cod, New Ipswich, N. H., and Bethel, Maine. . . . Again, **Max L. Waterman** makes the newspapers. The Singer Manufacturing Co. announces the retirement of Max as their vice-president of research and development. He has been associated with Singer since graduating from M.I.T. in 1913. He moved to the company's New

York office in 1936 when he was named assistant vice-president. Max was elected to the M.I.T Corporation in 1955; he also has been a director of the Bridgeport Hospital as well as a trustee of the Bridgeport Peoples' Saving Bank since 1951. Welcome, Max to our leisure class. . . . We appreciate Larry's report on 1913's participation in the annual Alumni Fund. Let's all endeavor to reduce that 128 non-participating group before next June.

Once again, we are the bearer of lamentable news. Our dear mate, **Philip M. Hamilton** died August 2, 1960. Phil was a graduate of Phillips Exeter and attended M.I.T. He spent the major portion of his business life with the Redman Card Clothing Company of Andover, Mass. He held membership in many Masonic lodges including the Aleppo Temple of Boston. The Class of 1913 extends its most heartfelt sympathy to his dear wife Margaret (Peever), his two sisters, Mrs. Lydia Webster of Concord, and Mrs. Ruth Redman, of Andover.

Our Scribe has received considerable literature from the "m.i.t. club of new york, inc." For a mere $12.50 any alumnus may become a member of this outstanding club, whether you are residing in greater New York or a visitor from the outside. The facilities and advantages are legion. They include: a meeting place for you, your wives and other friends; various programs, social or technical; room reservation and ticket arrangement with the Biltmore; inexpensive luncheons or dinners; daily club table and monthly luncheons; convenient place for business meetings; a News Letter regularly published; a Club Directory; a full-time secretary who will assist you; and a cocktail bar. All of these facilities are available from 10:30 A.M. to 7:30 P.M. every weekday. Why don't you send your $12.50 to the M.I.T. Club of New York, the Biltmore Hotel, New York 17, N. Y., together with address and job date for the Directory, or communicate directly with Howard M. Bollinger '43, Chairman of the Membership Committee? . . . We hope that you noticed on page 34 of the December Technology Review the mention under Books of Ed Cameron's latest publication, "Samuel Slater: Father of American Manufactures," also the review by Professor Edward Schwartz. Good work, Eddy, we are proud of you and it is refreshing to know that you are back again in circulation.

With a very heavy feeling, it becomes necessary for us to announce the death of one more of our classmates. **Harry S. Parker** died at Goffstown, N. H., Aug. 8, 1960.

Outside of **Bill Brewster** and **Goeffrey Rollaston,** who have said that they would be present, your committee for a large or small reunion has not heard from any others. They are waiting for at least a little encouragement. Next Spring, 1961, your Alma Mater celebrates its Centennial observation. Don't you want to be present on Alumni Day? . . . Change of addresses: **Kenneth B. Blake,** 7634-114th Pl. SE, Hazelwood, Wash.; **John W. B. Ladd,** 65 Highridge Ave., Ridgefield, Conn.; **Harry S. Wright,** P.O. Box 515, Sedona, Ariz.; **George W. Bakeman,** "The Oaks," Hanover, Va.; Major **Karl R. Brill,** 3254 Buchanan St., Hollywood, Fla.; **David H. Hilliard,** Great Neck, Ipswich, Mass.; **Manuel Font,** Box 218, Roosevelt Colegio de Ingenieros, Puerto Rico; **Samuel S. Crocker,** P.O. Box 84, Manchester, Mass.; **Thomas R. Reyburn,** Marie de Villa, 13900, Clayton Rd., Manchester, Maine; **Max J. Shafran,** 51 Sevlan Rd., Newton 59, Mass.; **Madison W. Christie,** 361 S.W. 2nd St., Boca Raton, Fla.; **Percy G. Whitman,** 2320 Cumberland Rd., San Marino, Calif.; **William N. Flanders,** 8503 Heron Lagoon Circle, Siesta Way, Sarasota, Fla.; **Henry C. Thierfelder,** 18 Myrtle Ave., Greenwood, Warwick, R. I. . . . So thank you all dear classmates for all the news you have forwarded to us; that is to you who did. To you who did not, we are starving for news, notes or just a picture postcard.—**George Philip Capen,** Secretary and Treasurer, 60 Everett Street, Canton, Mass.

'14

A nice note was just received from Colonel **Lucian Burnham,** who for several years has lived in Pasadena, Calif. He has been retired from the Marine Corps for some time, and now devotes most of his time to his flower garden. The blizzard in Cambridge today has made me envious of his attractive garden which I saw when I was last there. Lucian said that his one complaint is that his overweight condition just keeps on.

One of the pleasantest parts of the meetings of the Alumni Council is the regular visits with **Crocker, Hamilton,** and **Harold Wilkins.** They seldom miss the scheduled meetings and we find it very pleasant talking about our classmates who have asked about others. A little note from some of you could make these Review Notes more interesting.—**Harold B. Richmond,** Secretary, 100 Memorial Drive, Cambridge 42, Mass.; **Charles P. Fiske,** President, Cold Spring Farm, Bath, Maine; **Herman A. Affel,** Assistant Secretary and Class Agent, R.F.D. 2, Oakland, Maine.

'15

Next month's column will have the full story of the big New York City Class Dinner held there at the Chemists Club on January 27. In cooperation with the celebration of the M.I.T. Centennial, our Class will have a Boston Class Dinner, Saturday, April 8 for all classmates. This should be a gala time and splendid chance for all men visiting Cambridge for the Centennial to join with other classmates at this dinner. Details will be sent you later. . . . **Jack Dalton,** active in the Second Century Fund campaign, has time to be general chairman of the Dr. Sarah M. Jordan Memorial Fund of the New England Hospital, Boston, for research in gastro-enterology. . . . The M.I.T. Club of New York with rooms and headquarters at The Hotel Biltmore, 43rd Street and Madison Avenue, is doing an outstanding job for M.I.T. Alumni in and around New York, and has made remarkable progress in recent years. The nominal $12.50 dues for out-of-town members give the privilege of facilities which any M.I.T. man can be proud to use in his business or his personal life. Membership provides a great deal for very little and is well worth your consideration if you are in or around New York City.

Time marches on. Now a Freshman grandson at M.I.T.: Vernon T. Stewart. His father Richard M., is 1932 and his grandfather **Vernon T. Stewart** is 1915. Congratulations to the whole family. . . . I don't think it violates any confidences to give you the following transcripts from two letters that show above and beyond any other way you could say it, the devoted feeling, the loyal interest, and the pride our classmates have in 1915 and in M.I.T. These were both received after our June Reunion. To **Ben Neal:** "With a business that grosses less than the individual income of many of my classmates and is currently in the red, it is economically unsound for me to make donations. However, the enclosed small check is in response to your plea for larger coverage no matter how small and is a token of my appreciation of good fellowship, and the work being done by men like you." To Jack Dalton: "The reports presented by you and Ben Neal were inspiring and indicate that our class will do its share in the great program ahead. I find an increasing pride in being an alumnus of M.I.T. and of a class like 1915 with its devoted officers." As you can surmise the first contained a small check, the second a large four figured one. What more stirring inspiration do YOU need; what warmer reward could Ben and Jack have?

Aftermath of Anne and **Ed Sullivan**'s recent round-the-world trip is a clip from the Adelaide, Australia, "News": "A group of American tourists flew into Adelaide this afternoon. And one of them has a problem—his name. He is Ed Sullivan, of Boston, Massachusetts, who is continually being hailed as Ed Sullivan, the top American TV star. 'Why, on this trip, at Tonga, a big party of nuns was waiting to receive me,' he said. 'They were terribly disappointed, and what could I say?' Mr. Sullivan's second big problem is people who insist he must be related to John L. Sullivan, who also originated from Boston. However, his flying trip around Australia leaves little time even to meet people, so he is not worried greatly about mistaken identities." In answer, Ed says simply that he is from the South Boston Sullivans! . . . The letter you have received from the 1915 Executive Committee is our attempt to clarify and explain the various fund-raising activities that 1915 is interested in and which are now current. Write me any questions and we'll do our best to answer fully for you. . . . This letter from **Herb Anderson** is typical of his bouncing old spirit and is indicative of what a marvelous recovery he has made. Keep it up, Andy: "I always ap-

preciate your friendly letters and thank you for your last note. If you should come down this way just a few days notice to make sure we are both home and we would like very much to have you both spend a night at least with us at the farm. **Sol Schneider** spent most of one day with me about two weeks ago and **Henry Daly** called up last week while I was away. I was most appreciative of their interest. The country is not quite as inviting at this time of the year. The pool has been put to rest for the winter but the fireplaces are pleasant for conversation about the days gone by and those to come. This invitation stands and I await only your word." With all the demands and solicitations upon you, let me make just a modest one for next month's column: "Help Azel."—**Azel W. Mack,** Secretary, 100 Memorial Drive, Cambridge 42, Mass.

'16

To start off, Ralph says, "May I remind you that the 45th Reunion is only four months away. Now is the time 'to get your house in order' so that you will be certain to be with us on that glorious weekend, June 9, 10 and 11. Remember the ladies are invited; they're sure to enjoy the Cape and particularly the Oyster Harbors Club. Congratulations are in order for the way **Steve Brophy** has taken hold of the responsibility of Chairman of the 45th Reunion. He as usual is going all out to insure a good turnout and a happy time for all. I am very grateful to him and to the others who are working to make this our best reunion to date. I look forward to seeing many of you on the reunion weekend. Be sure to come. Bring your golf clubs. It's a great course."

On November 10 **Bob Wilson** gave a most interesting paper before the American Philosophical Society in Philadelphia on "The Need for the Early Resumption of Underground Nuclear Weapons Tests," speaking officially as a Commissioner of the A.E.C. Here again is must reading—a clear statement of the problem, a sharp analysis of how things stand, and a clearcut recommendation of what should be done now—all in words phrased as only Bob can phrase them. Here's a segment: "In view of all these facts it seems clear to me that we must resume underground testing of weapons without appreciable further delay unless we promptly achieve an agreement providing for adequate controls and mutual inspection. Patience has ceased to be a virtue and has become a very real danger to the nation—and indeed to the whole free world. Such tests would not involve any significant atmospheric contamination or fallout, though the seriousness of that has been greatly exaggerated in the public mind."

Theron Curtis says he has been trying to learn how to enjoy semi-retirement over the past three years, and so far it is great. He says health is the important thing and they have been very lucky so far. They live near three of their seven grandchildren which is an inducement to stay close to home. Finally he says: "Traveling is for itchy people and we have had enough of it." He will be at the reunion. . . . **George Maverick** continues very active and happy in this new second career of his, as head since 1955 of the newly-formed (1955) Graduate School of Business Administration in the University of Virginia, Charlottesville, Va. His school activities in June make it pretty near impossible for him to get to Cape Cod Reunions because of their timing "but seeing the picture of so many old friends that did gather is mighty pleasing." Of course, we're all hoping that 1960 will be the exception to the general rule. He notes that they have had a very busy time since '55 when the graduate business group was starting its first operations, and their farm, known as Shepherd's Hill farm, was a pretty ragged camp in the woods. Says: "Now both the school and the farm are quite solid institutions. The professors we work with are younger than our own children but they treat us like equals—which we find wonderful! We certainly work harder and have more energy than five years ago. Since July I have made hurried trips to Washington and New York and Mexico. Next week I leave for two weeks in Texas on University of Virginia business." That was in December. George notes especially that, when any of the crowd drives south, the Mavericks would welcome a visit.

John Fairfield continues teaching (emeritus, he says) half-time at Rensselaer Polytechnic Institute in Troy, N.Y. Two grandchildren are his pride and joy. This past summer he took a trip to the Gaspé Peninsula in Quebec and was able to make comparisons with what he saw 20 years ago. . . . **Don Webster** reported in November that everything was serene in Falmouth in spite of being next door to Hyannisport. He forwarded two clippings, one about **Bill Drummey** and another on "Santa" (that's the way he wrote it) and Mrs. **Claussen.** The Bill Drummey one was an announcement regarding his firm, and read as follows: "Colonel Wm. W. Drummey, B.S., M.A., D.Sc, is pleased to announce that effective today Richard C. Rosane, A.B., M.Arch., and David W. Anderson, A.B., B.Arch., are his partners in a new firm, Drummey-Rosane-Anderson, Architects-Engineers, 80 Boylston Street, Boston 16, Mass." The other clipping was a long one about Mrs. Howard Claussen, "The Gift of Politics Was Her Heritage," published in the October 11 issue of the Falmouth Enterprise, and giving an interesting picture of her many activities in politics, particularly in the upper circles of the Republican party in Massachusetts. As the daughter of Congressman Charles L. Gifford, who represented the Cape continuously for more than 25 years until his death in 1947, she has been active in politics all her life. This year, as in 1948, she was selected as one of the 16 Republican Presidential electors. We, at the 44th Reunion, all know of her participation in the designation of Mr. Volpe as the Republican candidate for Governor of Massachusetts. And please note—he won!

Ed Williams writes from 116 Ocean Blvd., Pompano Beach, Fla. Says he greatly enjoyed the picture of the 44th Reunion and it looks to him as though Jimmie Evans has the same old smile he had back on Boylston St. Says further that they went down to Florida early this year so that they could locate a house for the season, that they plan to take things easy until around May 1 when they'll start back to the Cape. He's hopeful of dropping in on the 45th in June. . . . **Aimé Cousineau** writes from Montreal that he's in good health and still keeping very busy. On November 20 last, he celebrated his 75th birthday. He notes: "As you know, although I am of the Class of '16 at M.I.T., I am also of the Class of '09 of the Ecole Polytechnique of the Univ. of Montreal." Aimé, who has a D.Sc. and P.Eng. after his name and got a degree in Course XI at Tech, was for years Mr. City Planner for Montreal itself; the 1955 Alumni Register showed him as Director City Planning, City Hall, Montreal, and since retirement from that post he has kept a consulting office in the Artisan Bldg., on Craig St. East. On some of his infrequent visits to New York, he has attended the 1916 monthly Class luncheons (the Thursday following the first Monday of each month; M.I.T. Club of N.Y. rooms in the Hotel Biltmore at noon).

P. P. Pizzorno writes from a vacation spot in Miami that he retired as of July 1, 1960 after 23 years of service with TVA. There he was a design electrical engineer in the Division of Power and Engineering Construction, working on the design of outdoor substations in the 161 KV to 14 KV voltage range. His message came in November, a little ahead of the start of the season in Miami, but he found things there most enjoyable. And he, too, intends to be at the 45th in June. . . . In Pittsburgh in September, **Willard Brown** received the highest award of the Illuminating Engineering Society, the "Medal Award." This gold medal is awarded in recognition of "unusually meritorious achievement which has conspicuously furthered the profession, art, or knowledge of illuminating engineering." Willard who retired this year from his position as General Electric manager of lighting education, is a fellow and former president of the society, and is the 15th person to receive the award. Twelve were from the U.S., one from Great Britain, and the other from Holland. As noted in a G.E. Company news release on September 12: "In his 40 years of association with G.E. he was active in a variety of lighting fields, including automotive, electrical advertising, theater, farm, school, and industrial. In 1948 he was named manager of Application Engineering, and in 1957 became manager of Lighting Education. A member of IES since 1923, his society activities have included six years as chairman of the Progress Committee, and chairman of the committee that developed the 'Recommended Practice of Industrial Lighting.' He was also chairman of the Finance Committee. As first chairman of the Lighting Committee of the American Society of Agricultural Engineers, he was largely responsible for G.E.'s first bulletin on farm lighting. He has authored many technical papers presented before IES and other professional

groups. Prominent in international lighting activities, Brown served as Director of the Secretariat on Lighting Practice at the CIE (International Commission on Illumination) meetings in 1939, 1948, and 1951. Currently he is president of the U. S. National Committee of CIE."

Frank Ross finds that on retiring from business, news is much more scarce than when he was active. Then he notes that probably the word "active" is wrong because he is active enough having fun and a good time. He says they have an apartment in Naples, Fla., for six months of the year and spend the rest of the year in West Hartford and traveling around. He plays golf several times a week while in Florida, and plays senior Golf Tournaments around the country throughout the year. No fishing yet but he supposes he will come to it one of these days. The town of Naples was hard hit by Donna last September, but, he says, it is surprising how soon a town can recover if it has the will to. Finally, from Frank, a "Hello" to all! . . . **George Bousquet,** too, has answered the call for a few lines. George retired from Allied Chemical in December '58 after about a quarter of a century of labor. But he says he could not adjust to being a gentleman of leisure, so after six months he started doing consulting in a field where he feels quite at home, i.e., transition metals, particularly Columbium and Tantalum. He's putting in about three days a week and is "having a wonderful time." Both he and Mrs. Bousquet are enjoying good health. In the fall of '59, they spent their vacation investigating the state of Maine, particularly Booth Bay and Bar Harbor areas. "Enjoyed our trip immensely and will return next fall, we hope." Their daughter Claire is doing very well in her career. She majored in chemistry in Mount Holyoke.

The Lowell Sunday Sun (several '16ers remember this paper and another, the Lowell Courier Citizen, from way back in High School days) had an important-looking picture (September 25, '60) of four people including someone we know, **Barney Gordon.** The caption tells the story best: "Awards For LTI Freshmen. Two entering freshmen at Lowell Technological Institute were presented awards by Barnett D. Gordon, president of M.K.M. Hosiery Mills, because of highest scores in the mathematics section of the Scholastic Aptitude test. Left to right, are: Mr. Gordon, David W. Gilligan of Billerica, who received $125 as a special gift of Mr. Gordon because of the closeness of his score to the highest; James W. Sullivan of North Andover, 1960 recipient of the annual Barnett D. Gordon $250 award for the topscorer in math; and Dr. Martin J. Lydon, president of Lowell Tech." . . . **Jack Burbank** reported receiving a card from the **McDaniels** in November, from Spain (Villa Oropendola, Arroyo de la Miel, Malaga —Espana) where they are staying for the winter, and says this provides another confirmation of Irv's intention to be at the 45th in June. Jack and Mrs. Burbank had just had dinner with the **Don Websters** the week before. The Websters have a son coming home from Europe next June to finish his education after leaving the Army. But what looked like big news to us was the casual note that Jack had a 42 in 9 holes that morning. Let's see, he's probably heading for a 38 or 37 at the 45th. **Bob O'Brien,** please note (Bob had a 35 at Chatham last June).

Joel Connolly, writing from Taiwan (Formosa, to most of us) in November, says that a reply to our letter of October was delayed because nothing much had been happening. But since then he had spent several days working in Quemoy, "one of the offshore islands about which Vice President Nixon and Senator Kennedy argued recently." Also since October he had climbed to the top of 11,208-foot Hotan Mountain in Taiwan. Joel sent along an interesting picture snapped about a month earlier. This shows Joel (good-and-healthy looking) on the side of a road, and a sedan chair being shoulder-toted along. He says: "In the sedan chair is a bride on her way to her wedding. She must not be seen until she arrives at the place of her wedding, so the curtains of the door and windows are down. On the back of the chair is a 'Ba Gwo,' an octagonal good luck symbol. In this photo, I am waiting for the sedan chair and its concealed bride to pass me so I would be able to snap a picture of the rear of the chair and its 'Ba Gwo.'" Joel may be addressed Box 7, ICA, Mutual Security Mission to China, APO 63, San Francisco, Calif. (Use a U.S.A. air mail stamp, and include the front page of your local newspaper.)

The December issue of the Review, in "Where Are They Now?" gave brief notes from M.I.T.'s retired professors. Included were words from **Shatswell Ober** (Aeronautic and Astronautics) of Arlington: "For 1959-60 I have been a Lecturer in the Aero-Astro Department. I have done nothing else of any particular interest. My position has proven enjoyable —some teaching, plenty of opportunity to read and think about the rapid changes in our field." In a picture of a luncheon group last spring, Shatswell looks just as sparkling as ever. . . . In the same issue of the Review, the list of Taiwan (Formosa) Alumni Officers for the 1960-61 season includes the name of **Joel Connolly** as Vice President. . . . This closes the column for the current month. Now, once more: Keep those dates open—June 9, 10, 11, for the 45th Reunion at the Oyster Harbors Club in Osterville on Cape Cod. **Steve Brophy** and **Jim Evans** report an expected heavy attendance. And this is the first of the 5-year reunions to which wives are invited, so don't miss it. Finally please don't wait to be asked to write. Send your few lines now.—**Harold F. Dodge,** Secretary, 96 Briarcliff Rd., Mountain Lakes, N. J.; **Ralph A. Fletcher,** President, Box 71, West Chelmsford.

'17

A testimonial dinner was given to **F. Stanley Krug, Jr.,** on July 27, 1960 by the Cincinnati Automobile Club on the anniversary of his quarter century of service as a member of the Board of Trustees of the club. The testimonial salutes Stanley as "Secretary of the Cincinnati Automobile Club, Consulting Engineer of the Club for 28 years, Chairman of City Streets-City Planning and Master Plan Committees, and Member of the Cincinnati Automobile Club for 35 years." Stan joined the "65 Club" last year. He writes as follows: "I sold out my business several years ago and am now dabbling in real estate. This, together with being an active director and officer of three corporations, namely; an insurance agency, The Cincinnati Cremation Company, and a box factory, keeps me busy. Then I have a hobby as Trustee and Secretary of the Cincinnati Automobile Club, a Club of 78,000 members. I am in good health and hope to stay that way. You can count on my being present at the reunion in 1962. Best regards to all my friends."

News has been received of the death of **Charles T. Barnard** of Wayne, Maine. Mrs. Barnard writes as follows: "Doc retired from the A & P in 1956 and we came here to live. The following year he took a job with the State and became assistant to the director of the Department of Public Improvement which has the responsibility for the care and upkeep of state-owned buildings. In August 1959 Charles had a stroke and was an invalid from that time until he died on November 7 of last year at the Veteran's Hospital." Charles was at the Institute three and one-half years in Course XI.

Another classmate, **Brian Curtis** of St. Helena, Calif., died on September 5, 1960. He was connected with the Division of Fish and Game for the State of California. He received his A.B. from Harvard in 1915, his A.M. from Stanford in 1934. He was at the Institute from 1914 to 1916 and connected with the course in Civil Engineering.

Harrison P. (Bill) Eddy was the subject of a two column picture in the Boston Sunday Herald of November 27th. The picture is explained thus: "Receives Citation—Harrison Eddy, senior partner of Metcalf & Eddy, engineering design and development firm, receives special citation from Gen. E. C. Itschner, Chief of Engineers, U. S. Army. Citation commends Eddy for patriotic civilian service." Among the many projects completed by Metcalf & Eddy for the armed services are: Thule Bomber Base at Thule, Greenland, the first major United States base in the Far North which was an outstanding example of a large-scale crash program; Ballistic Missile Early Warning System; work in Antarctica in connection with programs Deep Freeze III, and Deep Freeze IV, covering feasibility studies for a proposed permanent airfield and appurtenances in the Antarctic; work on White Alice, Alaska, to provide dependable communications among the many military installations in the state; and Air Force and Naval Installations in Spain. We understand that Bill has personally visited each one of his projects throughout the world except Antarctica.

Among the random notes are the following: **Stan Dunning** has agreed to represent the class for the next five years on the Alumni Council. . . . **Brick Dunham** is enthusiastic about his three months'

trip to Europe last summer. . . . **Al Lunn** has just returned from a month's business trip to England and the Continent. . . . **Bill Dennen** severed his business connections on November 15, and with Mrs. D. left for Indianapolis to spend Thanksgiving with son Dave, and then on to Los Angeles to spend Christmas with son Dick. From California, Bill leaves for Mexico where he will remain for the annual Mexico City Fiesta. . . . **Dix Proctor** and wife are off again for a winter cruise on a freighter. This time it is around South America from San Francisco. . . . **Ray Blanchard** has added to his retirement activities by taking on the job of President of the Melrose-Wakefield (Mass.) hospital. . . . **Walter Beadle** is chairman of Leadership Gifts from Individuals for the Second Century Fund of M.I.T. . . . **Loosh Hill** wishes that these notes could be brightened up with stories other than news of retirements, grandchildren, and notices of classmates being ferried across the River Styx. The secretary is always eager for news of remarriages, divorces, or scandals of any kind to balance up the news items.

A big centennial celebration is to be held in Cambridge at the Institute in April and a 1917 get-together is being planned for Saturday, April 8 for 1917-ers and wives who happen to be present. Publicity will undoubtedly be on its way in the near future so that everyone may make plans.

The Boston Herald of December 4 reported that: "Jackson & Moreland, Inc., has named **John R. Coffin,** former senior vice president, to the office of President." . . . **Stan Dunning** is, in his words, "putting away the brief case December 31." He has a well-planned retirement in mind, and has decided that for winter exercise he is going to polish up his ice skates to take advantage of the New England winter sports. Stan, together with **Al Lunn, John De Bell** and **Ray Stevens** are serving on the Massachusetts Industry Committee for M.I.T.'s Second Century Fund.

We will wind up these notes with a letter from **Carlton M. Dean,** St. Louis, Mo., whom we have not heard from for a long time: "Until the end of November 30, I was director of Engineering Sales for Monsanto with headquarters in St. Louis. Since November, I am on a consulting basis with Monsanto and shall work 75 per cent of the time. I have really had a fascinating job all of these years in that we sell the design of plants for various chemical processes, guarantee performance, train the client's operators, etc. These plants are built all over the world by various associated contractors, so much foreign travel has always been involved. In fact, you will be amused that I retired last Wednesday, have kept working the last two days, and am off in another hour on a hasty business trip to Morocco, Italy and Spain. We have a married daughter in Kansas City, with three children. We have an M.D. son in Denver where he has another one and one-half years to go before he completes a residency in urology. He also has three children, including a recently arrived Carlton Miles Dean III."—**W. I. McNeill,** Secretary, 107 Wood Pond Road, West Hartford 7, Conn.; **Stanley C. Dunning,** Assistant Secretary, 1572 Massachusetts Ave., Cambridge 38, Mass.

'18

Approached from one point of view, life is a long repetitive process of getting tired, enlivened as we go along by minor revelations. **Ernest Reuben Bridgewater,** like most of the rest of us, was not born tired. A restless ambition took him from Cuyahoga Falls, Ohio, to the University of Akron and thence, after two years, east as far as the north bank of the Charles River. Thus he missed the precious opportunity only 1918 had, of two years on Boylston Street and two on Memorial Drive, or would you say Massachusetts Ave.? Ernest was the studious type, overcoming the distractions of Lambda Chi Alpha and avoiding all extra-curricular activities except a membership in the Chemical Society. This calm and collected approach to responsibilities led logically enough to becoming a rubber chemist via the Chemical Warfare Service of World War I, the B. F. Goodrich Rubber Company, and the Firestone Tire Co. In 1924 came the still elastic but non-rupturing connection with du Pont, still as a chemist. Then the reasons for his going home worn out at night assumed a pattern wholly unexpected by those who predict professional achievement by studying academic records. In five years he was made sales manager of the Rubber Chemicals Division. On the basis of this executive success he became division manager two years later. In 1949, following the consolidation of division manufacturing activities into a separate division for the Organic Chemicals Department, he was named director of sales for the Rubber Chemicals Division and in January, 1957, became assistant general manager of the newly created Elastomer Chemicals Department.

Throughout his career Bridgewater played a key role in commercializing neoprene and making it the vital and widely used synthetic it is today. Since first produced in 1932 its use has expanded to more than 300 million pounds a year. During World War II so many military applications were found that it was listed as an essential raw material. Now, tired enough by all this valiant effort, he retired as of January 1, bringing to a close what might be called a 37-year Ernest effort for du Pont. He is a member and past chairman of the Rubber Division of the American Chemical Society and a Fellow of The British Institution of the Rubber Industry. Numerous patents have been issued in his name and he will be found as author of many articles on synthetic rubber.

The custodian of this column never tires of reporting the achievements of his fellow classmates, even when the item is meager. **Eaton James Clogher** is vice-president of Frione & Company of North Haven, Conn. What tires him every day is contract work on bridges, roads, and dams, which just goes to show how an electrical engineer can invade the provinces usually reserved for those who have become sleepy over the textbooks of a civil engineer. . . . **Wingate Rollins** has developed his evening weariness as a heating, ventilating and air-conditioning sales engineer in the greater Boston area, based on what he was taught in Engineering Administration. He has four children, seven grandchildren (when last reported), two patents on some gadgets for automobiles, and still not worn out, gives of his energy as state financial secretary for the United Cerebral Palsy organization. . . . **George Arthur Sackett,** another chemical engineer and in West Haven only 90 degrees from Clogher, is director of Repair Material Development for the Armstrong Rubber Company. He, too, has published some papers on rubber chemistry, served as chairman of the Repair Materials Technical Committee of the Rubber Association, and as a member of the Ordnance Advisory Committee on tire reconditioning. Going way back (also from camel back) he was in Sumatra from 1929 to 1932 when natural rubber was a hotter issue than now. He has a daughter and two grandchildren. . . . I have just been reading about an early industrialist in our town who had 61 grandchildren. Life is a long repetitive process of getting tired because rest has been earned.—**F. Alexander Magoun,** Secretary, Jaffrey Center, N. H.

'19

A Christmas card from the **Kitchins** brings us news of Don and his wife, Evelyn. Don keeps up with his swimming and is now having a wonderful time with a new Mason Hamlin Piano. Evelyn says she is feeling better than in years, does a lot of hiking and has attended a copper class. Don is still faithfully doing his job reminding us of the need to support our annual Alumni Fund. . . . **Cut Davis** writes that he has the travel bug. Last year he and Mrs. Davis took a trip to Switzerland, Vienna and London. This fall they went to Ireland, Scotland and London. "The left hand driving didn't bother and we enjoyed a U-Drive-It." . . . **Francis A. Weiskittel** writes that he is still in Baltimore. (He has had only two addresses in 42 years.) His wife died three years ago, and he is doing his best to raise his children, a daughter and two sons, ages 12, 13, and 15.

Your secretary is working hard on the Twentieth Century Fund, to which I trust you are all contributing. Last evening I attended the Silver Stein dinner given by the M.I.T. Club of New York City. Dr. Killian gave a most interesting speech.—**Eugene R. Smoley,** Secretary, 30 School Lane, Scarsdale, N. Y.

'20

It is with profound sorrow and regret that I record the untimely death of one of our most distinguished and highly regarded classmates, **Ralph Douglas**

Booth. Ralph was an internationaily known engineer. He was a licensed engineer in 17 states of the United States, as well as in Puerto Rico and with the National Bureau of Engineering Registration. He was a member of the American Petroleum Institute, Conference Internationale Des Grands Reseaux Electriques (C.I.G.R.E.), Paris, France, and a Fellow of the American Institute of Electrical Engineers. Shortly after graduation, Ralph joined Jackson & Moreland as an assistant engineer, and thereafter had responsible charge of a number of extensive engineering assignments throughout the country and overseas. In 1927 he was made a partner and continued so until 1955 when the firm was incorporated, at which time he was made executive vice president. He was made president in January 1959 and held this office until the time of his death. During the war years Ralph was active with the Department of Defense in Washington, having key roles with the Office of Scientific Research and Development. He was a member of the Newcomen Society, the Algonquin, Commercial-Merchants and Engineers Clubs of Boston, and the Engineers Club of New York. Surviving him are his widow, Mary (Armstrong) Booth of Salem Depot, N. H., a son, Ralph Douglas, Jr., of Lee, N. H., and two granddaughters.

Word has been received of the death of Col. **Charles B. Meyer** who obtained an Electrical Engineering degree with our class after graduating from West Point some years earlier. Col. Meyer commanded the first anti-aircraft regiment ever formed and directed it in World War I. During World War II he established the army's first diving school. Upon his retirement he lived in Bradenton, Fla.

Jerome Franck is president of Warshauer & Franck, Boston manufacturers of dresses, over three million of which have been sold under their label. He is recognized as a leader in the garment industry and is a past president of the Apparel Industries of New England and of the Boston Apparel Guild. A tireless civic worker, Jerome is a member of the Combined Jewish Appeal, former industry chairman of the United Fund and Red Cross, and present chairman of the Heart Fund. He is a member of the Board of Governors and a past president of the Pinebrook Country Club in Weston. . . . **John Barker** who is director of the Maine Medical Center has been appointed to the Medical Department Visiting Committee of M.I.T. . . . **Ed Burdell's** latest address is Middle East Technical University, 24 Mudafaa Caddesi, Ankara, Turkey. . . . **Al Peterson** may be reached at Apartado 9361, Caracas, Venezuela, S.A. . . . Our noted bon vivant and world traveler, **Chuck Reed,** has cropped up at Christiansted, St. Croix, Virgin Islands. Before that, he stopped at Houston to visit his son, Edwin, M.I.T. '45, and his three grandchildren.

A welcome letter from **K. B. White** expresses keen regret that he could not join the gang for the reunion last June. On the very day that our reunion started, he was notified by the French government that he had been made a Chevalier of the Legion of Honor, which is the most coveted of all French decorations. It was awarded to K. B. because of his services to French industry over the past 30 years. Since the war K. B. White & Company, management consultants with headquarters in Paris, has carried out complete reorganization of a number of the very largest French industrial units and has been responsible for introducing many new American management methods to Europe. K. B. has also been active in executive training work. His company initiated work simplification on the continent and has trained as many as 500 young men to introduce work simplification practices in factories and offices. The French government gives him and his company due credit for the rapid increase in industrial effectiveness and that is the reason for their according him the recent high honor. His sponsor at the medal awarding ceremony was Maurice Herzog, the High Commissioner for Youth and Sport, better known in this country as the man who climbed Anapurna. K.B. sends best wishes to all his classmates. His business address is 14 Rue Fortuny, Paris 17. His company also has offices in London and New York.— **Harold Bugbee,** Secretary, 7 Dartmouth Street, Winchester, Mass.

'21

"Hoomanawanui," we have it on good authority, is the word for "calm down and take it easy" in our newest State of Hawaii. It is certainly the keynote of our Fortieth Reunion next June, which **Mel Jenney**'s committee has set in the quiet charm and luxury of the Shore Club of the Mayflower Hotel on historic Manomet Point in Plymouth, Mass. Have you returned that questionnaire with the indication that you and your wife will be there? Please do it now, so Mel will know in advance how to plan for you and your guests. Your reply is requested, whether or not you now plan to attend. Many thanks if you have already answered.

From that lovely new Fiftieth State comes a note from **Harry** and Catharine **Field** of Honolulu, saying: "Will see you in Cambridge for our Fortieth Reunion. Catharine and I will be in Japan from next April 15 to June 1 to attend the Rotary convention in Tokyo. I am a member of the convention committee." We are delighted to receive a beautiful photograph of this popular couple, taken amidst the rich foliage of their home at 49 Kawananakoa Place, Honolulu, and it is a welcome bit of news to have them confirm that they will travel such a tremendous distance to be with us at the Mayflower from June 8 to 11 and at the Institute's Hundredth Anniversary Alumni Day celebration on campus in Cambridge on June 12.

Stop-press news: Hot from the national scene comes the announcement, forwarded through the courtesy of keen observer **Chick Dubé,** of the election of **Jack Healy** to the presidency of the American Institute of Chemical Engineers. Jack thus joins that select circle of the Class of 1921 honored and acclaimed by election as chief executives of an even dozen of the leading national professional societies. A former vice president of the A.I.Ch.E., Jack is currently a member of the corporate planning group of Monsanto Chemical Company, St. Louis, Mo. Originally with Merrimac Chemical in Everett, Mass., he joined Monsanto in 1929 and has been assistant to the vice president in charge of research, development and engineering and also the director of development of the research and engineering division. Congratulations, Jack, and many thanks, Chick.

Reading the recent Saturday Evening Post article on Scottsdale, Arizona, set us to wondering what **Dave** and India **Woodbury** were doing and, sure enough, they anticipated our queries with a note which says, in part: "Christmas rolls around again and finds us 3,000 miles from home. May be near the end on that as we plan to sell out here pretty soon and return to Ogunquit for good. The plan includes building a winter house there next summer. Meanwhile, we are going to Hawaii in January to visit the grandchildren." What a pleasant prospective itinerary to receive as we prepare these notes to the accompaniment of a howling 17° gale which has already dropped twenty inches of snow on northern New Jersey! The Woodburys say they intend to join the large Hexalpha turnout next June.

Jack and Elizabeth **Barriger** of Pittsburgh sent their usual warm greetings, adding: "May all signals in the block show a clear track ahead for you in 1961." **Dug** and Betty **Jackson** never fail to outdo the previous year's rhymed story of their travels and the new arrivals in the family. This year is no exception. From Tetrastremma, Harmony Hills RFD 1, Havre de Grace, Md., they have roamed to New England, New York, Indiana, New Orleans and to our 1921 Reunion in Mexico City, but the high spot was welcoming their eleventh grandchild in Florida. **Gus Kinzel** and **Dick Windisch** are taking active parts in the M.I.T. Club of New York. Gus, who recently addressed both the New York and Northern New Jersey alumni clubs, is scheduled to be the speaker at the April 21 dinner of the Long Island alumni. **Larc Randall** has relocated his firm, Larcom Randall Advertising, at 308 Boylston Street, Boston 16, Mass. **Jack Whipple,** formerly of San Francisco, gives his new address as care of the American Embassy, Colombo, Ceylon, but does not say what he is doing.

Class Prexy, **Ray St. Laurent,** phoned details of the monthly meeting of the Fortieth Reunion Committee in Boston and said he had received letters from **Chick Dubé, Jack Kendall** and **Sam Lunden.** Chick reported on the impromptu reunion we had in New Jersey. Jack and Marge were visiting the grandchildren in Los Altos, Calif., for Thanksgiving, following his return from a journey to Denver, Washington, Atlanta and Oklahoma City. They plan to be at the reunion next June. Sam, who formerly headed the firm of Samuel E. Lunden Associates, has an-

nounced the formation of a new company. Located at 548 S. Spring Street, Los Angeles, Calif., the organization is known as Samuel E. Lunden and Joseph L. Johnson, Architects and Planners. **Saul Silverstein** addressed the Junior Industrial Club of Hartford, Conn., last November on "Human Relations." **Joe** and Dorothy **Wenick, Sumner** and Betty **Hayward, Cac** and Maxine **Clarke** attended the large December meeting of the M.I.T. Club of Northern New Jersey to welcome the speaker, our distinguished President, Jay Stratton '23.

Buck Buckner writes: "Stop by and see us at 817 Moffett Lane, York, Pa. Mary and I haven't forgotten the way you entertained us." He encloses an interesting set of his personal remembrances of the 58 men who were members of Kappa Sigma at Technology from 1917 to 1922, which he had mailed to all of them with holiday greetings. Of the 1921 contingent, Buck says: "**Phil Coffin** was my roommate throughout the Course VI-A period under Bill Timbie. He is blessed in accomplishment and offspring. I recall stumping him with the question: Since a mirror image goes right for left, why doesn't it go upside down, also? **Art Garnich** was a happy, friendly guy, always on the move. If I have heard correctly, he is vice president and general manager of E. Garnich and Sons Hardware Company, West Ashland, Wis. **Art Gatewood,** quiet and profound, was quickly appointed second lieutenant, then captain of our company in 1918. He knows boats from A to Z, is now top man (Chief Engineer Surveyor) of the American Bureau of Shipping and tells them whether or not they can sail. **Howard MacMillin,** energetic and friendly, was in the hydraulic press business and now heads his own engineering company in Chicago.

"**Mike Munce** lives in York, near me. He was **Liz Gatewood's** V.M.I. pal at Technology. His is an illustrious career with York Ice Machinery, in charge of Washington sales, British sales, and vice president in charge of public relations. **Ed Schock** did his work so well I might have known it would now be 'Professor.' He is at the University of Rhode Island. I believe I 'rushed' **Herb Thaden.** He has his own engineering company in Roanoke, Va. **Army Wellford** was our house master. He has been with the Appalachian Electric Power Company, Bluefield, W. Va., since graduation." Of himself, Buck writes that, thanks to Mary and an interesting job, he is happy. He is sales manager of the Metropolitan Edison Company. Son Jim manages the UPI office in Reno. Thanks for the notes, Buck, and here's to seeing you two in June.

Rumor hath it that **Larc Randall** was married in December and that the important event was followed by a trip to Europe, on which the newlyweds were accompanied by **Charlie** and Ruth **Williams** of North Guilford, Conn. Hearty good wishes are the more so in anticipation of letters from both of these Course VI brethren. The photographic artistry of **Bob Miller,** Class photo-historian, is evidenced once more in the pictorial report which he and Helen make annually on their photogenic family group. The circle of eleven includes Peggy's husband and the two lovely grandchildren. **Richmond S. Clark** gives his business address as P.O. Box 3807, Baytown, Texas. He is Coordination Division Head, Humble Oil and Refining Company. **Glenn Stanton** heads his own architectural offices at 208 S.W. Stark Street, Portland 4, Ore. **Frank H. E. Whelan** maintains the offices of his consulting engineering firm at 11 Beacon Street, Boston 8, Mass. **Simon W. Freese** is a partner in the consulting engineering organization of Freese and Nichols, 407 Danciger Building, Ft. Worth, Texas. Commander **Bernard H. Moran** has retired as Education Officer, Bureau of Naval Personnel, Washington, D. C., and is living at 6 Grant Street, Natick, Mass. Dean **James R. Cudworth** of the College of Engineering, University of Alabama, says his home address is 1 Hickory Hill, Tuscaloosa, Ala.

Ralph Wetsten sent a welcome personal note, adding that he plans to attend the reunion next June. He is Street Lighting Engineer of Public Service Electric and Gas Company, Newark, N. J., and is well known for his musical talents, particularly in making use of the unusual capabilities of the electronic organ. Others who have already signified their intention to be present at the June gathering of the Class include **David P. Wheatland** of Topsfield, Mass., who is Curator of Historical Scientific Instruments at Harvard University. . . . **Irving Winslow** of Holbrook, Mass., engaged in school construction with Korslund, LeNormand and Quinn, Inc., Norwood, Mass. . . . **Miles M. Zoller,** Vice president and director of Eagle Picher Company, Cincinnati, Ohio. . . . **George Schnitzler,** electrical engineer with the U.S. Bureau of Standards. . . . **Leo Mann** of the manufacturing firm of Leo Mann and Company, Boston, Mass. . . . **Watts S. Humphrey,** investment counselor with Laidlaw and Company, New York City. He and Winifrede live in Princeton, N. J. They have four sons and a daughter and six grandchildren. Watts saw service as a colonel in the Eighth Air Force during World War II and received the Legion of Merit and the Bronze Star.

Colonel **Robert Elton Guthrie,** U.S.A., died on October 31, 1960, and we extend sincerest sympathy to his family. A native of Santa Barbara, Calif., he was associated with us in the senior year in Course I.

1921 Calendar: Members of the Class who wish to attend the dinner in Cambridge on April 8, during Centennial Week at M.I.T., will be seated together. No official Class functions are planned for that week.

Our Fortieth Reunion on June 8 through 11 at the Mayflower Hotel, Manomet Point, Plymouth, Mass., includes wives and guests. Transportation will be available to Cambridge and also accommodations there for the group to attend the special observance of Technology's centennial at Alumni Day on campus on June 12. Send in that questionnaire at once and say you want to be counted in on this gala reunion. Don't put it off. Do it now!—**Carole A. Clarke,** Class Secretary, International Electric Corporation, Route 17 and Garden State Parkway, Paramus, N. J.; **Edwin T. Steffian,** Assistant Class Secretary, Edwin T. Steffian, Architect, 11 Beacon Street, Boston 8, Mass.; **Melvin R. Jenney,** Class Fortieth Reunion Chairman, Kenway, Jenney and Hildreth, 24 School Street, Boston 8, Mass.

'22

Once again your secretary has his bag packed and is writing notes on the way to Augusta for a few rounds of golf. **Parke Appel** has promised to cover the annual Silver Stein Award Dinner at which **Duncan R. Linsley** will be honored. Congratulations from all '22'ers to Dunc for the great and constant effort he has expended for M.I.T. We are most proud to have this distinguished alumnus recognized by the M.I.T. Club of New York. . . . Chick Kane has forwarded a clipping from Newsweek of November 21, describing the exquisite color photographs of hummingbirds by **Crawford Greenewalt.** . . . Under the letterhead of the Foreign Service of the United States of America with dateline American Embassy, Tokyo, Japan, November 18, 1960, is the following letter to **Oscar Horovitz:** "Dear Mr. Horovitz: I recently had the pleasure of accepting on your behalf an award for your film production, 'Rangoon Prays and Plays.' Your film was awarded a Fine Works Prize by the Second Tokyo International Amateur Film Contest. The presentation ceremony was held on November 8, 1960, and was attended by many dignitaries including H.I.H. Prince Takamatsu. I am forwarding your award and diploma to you under separate cover. May I take this opportunity to congratulate you upon your success in this endeavor. Signed, George Hellyer, Counselor of Embassy, Japan." Congratulations to Oscar for doing his usual, unusually fine job.

Ford Blanchard and Ray Burrus have forwarded clippings of the death of **William MacMahon,** retired engineer of construction for the Washington Gas Light Company. Bill was past president of the Arlington Safety Council and served on the Arlington Hospital Board. Our sympathy goes to his wife and family. . . . We have received new addresses for **Earl E. Mader,** Thomasville, Ga., and **Aubrey Nicholson,** East Walpole, Mass. . . . And a merry Washington's Birthday to you all.—**Whitworth Ferguson,** Secretary, 333 Ellicott Street, Buffalo, N. Y.; **C. George Dandrow,** Assistant Secretary, Johns-Manville Corp., 22 E. 40th Street, New York 16, N. Y.

'23

Those of you who happened to be tuned in to the Gary Moore show on TV the evening of November 21 had the privilege of hearing our own Dean **John Burchard** have an interesting discussion with Gary Moore on the subject "Big City—1980." . . . The Boston Globe of

November 20, featured a science article concerning fusion and Dr. **William P. Allis'** part in this program. Apparently hopes have been high that fusion would provide cheap power. Conclusions have been reached by scientists that the production of power by this method would be so expensive as to be uneconomical. Dr. Allis, whose theoretical work is supported by funds from the National Science Foundation, believes that continued research can still pay dividends.

We regret to report the following deaths: Dr. **Paul A. Heymans,** 20 Square Vergote, Brussels, Belgium, on November 19, and **Sidney G. Walton,** Matson Navigation Co., 215 Market St., San Francisco, Calif., on December 4. No details are available.

We wish to advise of the following address changes: **Russell H. Baker,** 1339 Great Plain Ave., Needham 92, Mass.; Prof. **Jose C. Bertino,** 11 de Septembre 927-1-B, Buenos Aires, Argentina; Dr. **Malhotra Des Raj,** White House, Golf Road, Ajmer, India; **Jorge E. Ferreyra,** Tucuman 715, Buenos Aires, Argentina; **Howard B. Keppel,** 157 East 57th St., New York 22, N. Y.; **Howard C. Maffitt,** 210 Seville Blvd., Lafayette, La.; Lt. Col. **Edward A. Murphy,** 2706 East Washington Ave., Escondido, Calif.; **Austin S. Myer,** R.R. #1, Box 43, East Haddam, Conn.; **Ping Y Tang,** South Sea Textile Mfg. Co., Ltd., 51 Edinburgh House, Hong Kong; **Karl J. Tobias,** 114 Ma Libero Beidaro, Sao Paulo, Brazil; **Roger E. Valentine,** R.R. #2, Zionsville, Ind.—**Herbert L. Hayden,** Secretary, E. I. du Pont de Nemours & Co., Leominster, Mass.; **Albert S. Redway,** Assistant Secretary, 47 Deepwood Drive, Hamden 17, Conn.

'24

No question when winter has arrived, for with it comes the flood of happy greetings from those of you who have gone South with the birds. Invariably the first to communicate is the **Henninger** family. Early in December an oversize card arrived from Key West, showing the "world famous 'Fontainebleau,' largest and newest hotel in Miami Beach." They had stayed there, at Palm Beach and Coral Gables, then headed across the keys. "Most delightful here in the lazy sunshine. This is John's favorite vacation spot 'neath the sheltering palms!" That was Marianne writing, of course. They were coming home for Christmas, then it's a sure bet they'll head back to one or another of "those divine places."

At the same time **Hank Simonds** was in sunny Napoli, and although his card was just as beautiful as that of Florida, with Vesuvius smoking in the background, it's doubtful that Hank was doing much basking in the shade of the sheltering palms. He was on the way around the world again, the sequence from his cards being Korea, Formosa, and Greece. An intriguing note from Formosa: "Go to the Persian Gulf for loading cargo to either East or West coasts from there. Women in the bars say we are to come back to Korea or Japan. We don't know."

But probably the prettiest of all the cards was one of the Grand Canyon, a Mike Roberts Color Production. Seems the **Winingers** took a trip around the country visiting children, and while in Tucson "came up here for a look at the most interesting place in the U.S." The Winingers have moved into their new home in Irvington-on-the-Hudson, a rambling redwood house with enough room for the children and grandchildren when they come to visit. Ed, by the way, is particularly set up these days because in a recent insurance physical he passed all the tests the medicos could think of with flying colors.

Dick Lassiter reported in recently on one of his trips to Boston. We've told you before that **Luis Ferre**'s multitudinous interests include a big concrete operation in Florida. It's getting even bigger, and Dick's company is constructing the enlarged plant. He hasn't been working with Luis, but with his brother Herman '31, who is evidently in charge of this branch of the business. . . . Another regular visitor recently was **Ingram Lee,** 2nd, from Dallas. Young Ike is the Texas Instrument talent scout for M.I.T. material. He said his father and mother enjoyed their Caribbean trip last winter so much that they can hardly wait to start off again. This time they'll tour between the Mediterranean and Ecuador. The Caribbean was their first real ocean voyage, and now travel is in their blood. . . . Others who have traveled of necessity are the **Amezagas,** now in Mexico City together with their daughter Hortensia and her husband. In November there was a gala party of the M.I.T. Club of Mexico and the Amezagas were there as evidenced by a picture in The News. The party was given to honor the outgoing president, **Clarence M. Cornish.** Forgotten how long Nish had that job, but the annual fiesta will probably never have as good an advance man. Remember all those little Mexican toys he brought up to reunion? And it wasn't just publicizing at which he excelled. A major portion of the detailed planning (and hosting) fell on his shoulders.

Bill Rosenwald didn't have to travel to get his latest honor. In New York he was presented with the 1960 Solomon Bublick Award of the Hebrew University of Jerusalem for "the most significant contribution to the progress and development of Israel." Bill, who is board chairman of American Securities Corp., headed the United Jewish Appeal for several years. Maybe he still does. . . . And here's a release from Molesworth Associates datelined, quaintly enough, "Last Vegas." It has to do with a merger of several companies to form Beryllium Resources, Inc. One of the directors is **Bengt Kjellgren,** board chairman of Brush Beryllium. . . . Two deaths have just been reported, although that of **Robert S. Gentle** happened three years ago. He was an architect in New York. . . . No date is given in the case of **George F. Way, 3rd.** He had been with Industrial Rayon in Cleveland for some years.

And so, as we head into the dead of winter, here's hoping all you happy people under your sheltering palms or cruising over the briny deep could exchange places with your secretary for just a short while, only so you would appreciate it all the more. At least drop him a colorful card.

The Review editors have allowed me to add a paragraph after these notes were written. It is one of the most difficult I have ever had to write. **Ed Wininger** was in Illinois on business just before Christmas. He was homeward bound on that DC 8 that crashed in Brooklyn. To Helen and all the children go the sincere sympathies of the entire class. It is truly a personal loss to all of us who knew him. Ed was one of the world's real gentlemen.—**Henry B. Kane,** Secretary, Room 1-272, M.I.T., Cambridge 39, Mass.

'25

A few months ago, **Ralph F. Gow**'s election to the Board of Directors of the United Fruit Company was noted. This, of course, does not do full justice to Ralph's activities as executive vice president and director of the Norton Company in Worcester. He is also director of six of the Norton Company's overseas subsidiaries. He has many other activities, a few of which can be noted as follows: Director, Worcester Mutual Fire Insurance Company; Trustee, Worcester County Institution for Savings; the Worcester Foundation for Experimental Biology; and The Memorial Hospital of Worcester. . . . As many of you are aware, **Ed deConingh,** Partner and Chief Engineer of the Mueller Electric Company of Cleveland, has been active for several years in the Greater Cleveland United Appeal. This year he has again been Chairman of Division A, the soliciting division of this great United Appeal.

Ave Stanton and I got together with **Phil Niles** a few weeks ago for luncheon and were pleasantly surprised to find that Phil's activities will be bringing him to the Boston area quite frequently in the future, and the opportunity to renew this old friendship will become available to many of us in this area. Phil's headquarters are of course in New York City. . . . Looking over this year's roster of the Alumni Council, it is pleasant to note that in addition to **Fred Greer** and Ave Stanton, who have been active members for some time, **Ed Kussmaul** has been made an associate member and for the fall season has established a 100 per cent attendance record.

On a sad note, recently information reached us that **William L. Carroll,** who has been associated with the Westinghouse Electric International Company in New York City, passed away on December 5, 1960. No further information has yet been received.—**F. L. Foster,** Secretary, Room 5-105, M.I.T.

'26

This is a far cry from Pigeon Cove—aboard a Viscount from Boston to Philadelphia on a Sunday afternoon in early

December. I hadn't even intended to start the notes but I was awakened from a relaxing snooze by the pilot's crackling voice over the intercom telling us that "we are passing over the Connecticut River and that it is a nice day." Being awakened I have taken the Class Notes folder from my brief case and will get to work. . . . First let me mention that I met **Al Lamoureux** at a meeting of Plastic Engineers recently and had a pleasant two-man reunion. Al, you may recall, has a large family and since seeing him last, several have finished school, are married and raising families, all to Al's great pleasure. He is in research at Dennison Manufacturing Company, as he has been these many years. . . . **Stark Draper** is slipping. We only have two of his awards to report this month. "C. Stark Draper received the Howard N. Potts Medal of the Franklin Institute," and "Dr. Charles S. Draper receives the citation and medal accompanying the Air Force Exceptional Service Award in recognition of meritorious service by Dr. Draper over the past 14 years." Actually, I probably missed a few awards because when we get down to two per month it's just not like Stark. . . . Here's a bit of thrilling sports news: "Two Massachusetts Institute of Technology sophomores placed first and fourth in the Class C New England Amateur Fencing League of America tryouts recently. One, Roberto Levis, son of the captain of the 1936 U.S. Olympic Fencing team, topped all entrants in the competition. In the 1936 Olympic games in Berlin **Joseph L. Levis,** Roberto's father, a six-time U.S. National Foils Champion, placed second in the fencing tournament. No other American scored in Olympic fencing competition until the 1960 games in Rome when an American placed third. Young Levis, 19, is majoring in Civil Engineering. He captained the 1959-60 freshman fencing squad." It is wonderful to see Joe's son following in his dad's footsteps. Congratulations coach Joe and son Roberto.

Well, the above was all I was able to accomplish on the Viscount flight from Boston to Philadelphia (1 hr. 22 min.). Upon landing at Philadelphia I phoned classmate **Willard Vaughan** who offered to come over and get me and drive me to Wilmington where his son is teaching. However, I had already checked my bag with the limousine. Three busy days in Wilmington gave me no time to pick up the notes but it is now 6 P.M. Wednesday and I am back at the Philadelphia airport aboard a DC-8 waiting to take off for Boston. If I had so little time on the Viscount, what can I accomplish on the jet (schedule 45 min.)? However, I must send the notes out tomorrow so here goes. . . . Here's a clipping that just came in from a classmate now living in Florida. **"Charles G. Hutzler,** Delray Beach, has opened a real estate office in Boca Raton at 420 North Federal Highway. Hutzler, a graduate of M.I.T. with a degree in civil engineering, moved to Florida two years ago from Connecticut. One son attends Stetson University in DeLand and another is a freshman at Duke University in North Carolina. Two daughters attend local Delray Beach Schools. Hutzler is a past squadron commander of the United States Power Squadron and is active in the local squadron." . . . Here's a clipping from a Salem, Mass., newspaper about **Bill Lowell:** "The appointment of William P. Lowell of Newburyport as manager of technical liaison of Sylvania Lighting Products, a division of Sylvania Electric Products, Inc., has been announced by Frank J. Healy, president of the division. Sylvania is a subsidiary of General Telephone & Electronics Corp. In his new assignment, Lowell will be responsible for maintaining technical contact with professional societies, trade associations and standardizing bodies in the lighting and electrical industry. One of the founding members of the NEMA (National Electrical Manufacturers Association) Lighting Fixture Section, Lowell has served on many technical committees and was chairman of the section from 1952 to 1954. He lives with his wife at 61 High Street in Newburyport and will continue to make his headquarters at Sylvania Lighting Products, 60 Boston St., Salem."

Another and less pleasant clipping has been received from **Bob Dawes,** our reunion chairman: "Sandwich, Mass. A funeral mass will be celebrated here Friday at 9 A.M. in Corpus Christi Church for **Alfred J. Govoni,** 57, of Jarves St., a career civil engineer with the Army Corps of Engineers. He died in New Bedford Tuesday. Mr. Govoni was a native of Plymouth and entered the Corps of Engineers in 1926 upon graduation from Massachusetts Institute of Technology." We express sincere sympathy to Al Govoni's family from the entire class.

Believe it or not I have finished the notes and we haven't reached Boston but I'll have to admit I had them pretty well organized before we took off. The ground services are not yet able to cope with the jet age and it took a half hour to load the plane. I couldn't carry my bag aboard as on a Convair or Viscount and had to check it only to learn upon reaching Boston that the airline had lost it. You can see that there was no saving in time or frustration by taking a jet on a short flight. But I did get the class notes written. See you in March!—**George Warren Smith,** Secretary, c/o E. I. duPont de Nemours & Co., 140 Federal St., Boston, Mass.

'27

Thomas A. Knowles, President of Goodyear Aircraft Corporation of Akron, Ohio, has been elected to the Board of Directors of the Cleveland Post of the American Ordnance Association. Ordnance Association objectives are the production of better weapons and materiel for the Army, Navy and Air Force. Committees of the AOA form Science-Industry-Ordnance teams which give counsel to the manufacturers of military equipment. Tom, who has headed Goodyear Aircraft, a subsidiary of The Goodyear Tire and Rubber Company, since 1947, has been with the Goodyear organization for more than 33 years. . . . **Jennings B. Hamblen** is involved in a move from New York to Chicago brought about by corporate reorganizations of Standard Oil Company of Indiana and American Oil Co. His new office address is 910 South Michigan Ave., Chicago 80, Ill., and home address is 1035 South Brainard Ave., LaGrange, Ill.

Harry Ingram has moved from Hingham, Mass., to London, England, and writes as follows: "Finding that ex-naval architects are presently unemployable at my age, my wife and I took two younger children to Europe to further their education while we all live at European cost of living on U.S. pension. Hope to be back in U.S. next June if Democrats have new Utopia running smoothly by that time. Came home this fall for a month for other daughter's wedding." Harry's present address is c/o American Express, London. . . . In the October 30 issue of the Boston Sunday Herald's Rotogravure Section, "MIT—A Century of Leadership —1861-1961," we noted several members of our class mentioned in various articles. The names of **Winthrop M. Puffer** and **J. Anthony Santangelo** appeared among those listed as M.I.T. graduates employed by Chas. T. Main, Inc., Consulting Engineers. This company has offices in Boston, Mass., and Charlotte, N. C. Also, the Ford Motor Company listed its M.I.T. graduates and **Frederick Hooven** was shown as Technical Assistant to Chief Engineer—Ford Division. An interesting article on Edgerton, Germeshausen & Grier, Inc., Boston, Mass., also appeared in this issue. Dr. **Harold E. Edgerton** is Vice President and Chairman of the Board.

Emory F. Patterson sent the following information: "Recently joined Stran Steel Corp., as general manager of Peoria Steel Bldgs., Inc., Washington, Ill. Home address: 323 West Corrington Ave., Peoria, Ill. Formerly with Luria Engineering Co., New England District Manager."

Of interest are the following up-to-date addresses of classmates recently received by the Institute: **Dwight C. Arnold,** 14 White Oak Rd., Wellesley Hills, Mass.; **Lathrop B. Merrick,** Route 1, Durham, N. H.; **Francis A. Mesker,** Rt. 2, Box 197, Florissant, Mo.; **Donald H. Spitzli,** Walpole, N.H.; and **John H. Wilson,** 436 Woodland Rd., Sewickley, Pa. —**J. S. Harris,** Secretary, Shell Oil Company, 50 West 50th Street, New York 20, N.Y.

'28

Jim Donovan sent in a clipping from the Book Review Section of the New York Times on "Man and His Body" by **Benjamin F. Miller,** M.D. and Ruth Goode. Ben Miller is one of our good classmates whose engineering education led to a career in medicine. He is presently Director of the May Institute for Medical Research in Cincinnati. He has authored several other medical books and writes for a medical news magazine. The review on Ben's latest has convinced us that this is one book we must not miss. . . . From **Charlie Worthen** we have

two news items, both relating to **John B. Russell.** One is a story on the reorganization of General Electric's Electronics Laboratory. The laboratory, employing some 300 scientists, engineers, and support personnel, is managed by John Russell. It provides technical support to the 16 product departments comprising G.E.'s Electronic and Flight Systems group. The second item is page 1822 of the November issue of Proceedings of the IRE. It is a fine biographical sketch of John and gives an excellent review of his illustrious professional career. John is a director of the Institute of Radio Engineers for 1960-61. Prior to joining General Electric in 1954, John was on the staff of the Electrical Engineering Department of Columbia University, where he was first an instructor (1931), then assistant professor (1935), associate professor (1946), professor (1949), and finally head of the department (1952). All of his degrees—B.S., M.S., and D.Sc. in electrical engineering,—were awarded to him at M.I.T. As a result of his technical competence, John has won for himself an impressive list of accomplishments and honors.—**George I. Chatfield,** Secretary, 11 Winfield Avenue, Harrison, N. Y.; **Walter, J. Smith,** Assistant Secretary, 15 Acorn Park, Cambridge, Mass.

'30

One of the amenities of the class secretaryship, I find, is that it provides a means for establishing contacts with classmates by routes not generally available to members of the class. Several weeks ago I received a note from the Review Office that **Wayne Soverns'** son, Wayne Jr., is a member of this year's Freshman Class at the Institute. This advice led to the discovery that Wayne is my closest classmate neighbor, and I had a pleasant chat with him. Wayne, his wife, who is a portrait artist, and their three children, Wayne Jr., Deanne, and David live in Larchmont, New York. He is associated with Skidmore, Owings & Merrill, and in recent years has worked on such projects as the very efficiently designed Arrivals Building at Idlewild airport and the new Union Carbide building here in New York.

Several months ago I decided to adopt **George Wadsworth's** procedure of sending out a certain number of letters to classmates each month in an effort to round up news items for the Class Notes. This practice has now begun to bear a modest amount of fruit. Responses from those whose names begin with "A" have run about 60 per cent. Most of this month's items are derived from this source. . . . **Denis Agar** writes that he is in private practice as a consulting engineer, chiefly engaged in exploration. His principal client is Rio Tinto Canadian Exploration, Ltd. Denis, his wife, and sons David and Heimo live in Bourlamaque, Quebec. He received a visit several years ago from **Bernabe Barrios** who was on his way back to Tampico after having demonstrated his piscatorial prowess at the Nova Scotia tuna fishing tournament. Bernabe captained the victorious Mexican team. . . . Some years ago **Bill Alling** decided to move from engineering into religious work. In 1953 he was ordained by the Bible Presbyterian Church, and after serving in a pastorate in Canon City, Colo., became Principal of the Cono Christian School in Walker, Iowa, where he teaches Bible, Science, Math and Latin. Bill's chief hobby is amateur radio and his call is KUSF.

Like Denis Agar, **Charles (Andy) Anderson** is in private practice as a consulting engineer. However Andy operates in the structural and mechanical field and specializes in such matters as building loadings and the "design of vessels for containment of vapors and gases under high pressure and temperatures." He and his wife and daughter Linda live in Lynnfield, Mass. He is a member of the Massachusetts State Civilian Team at Camp Perry for National High Power Rifle Matches and instructor in firearms training of the Lynnfield Auxiliary Police. . . . **Ralph (Appie) Appleton** is president of the Good Realty Co., in Columbus, Ohio. His son Fred graduated from Kenyon in 1959 and daughter Dorothy is a sophomore at Wellesley. . . . **Bob Asbury** is with Ethyl Corporation in Baton Rouge, La. His daughter Carolyn is a senior at L.S.U. . . . If all goes well, there will be some items next month about classmates whose names begin with "B."—**Gordon K. Lister,** Secretary, 530 Fifth Ave., New York 36, N. Y.; **Ralph W. Peters,** Assistant Secretary, 249 Hollywood Ave., Rochester, N.Y.; **Louise Hall,** Assistant Secretary, Box 6636, College Station, Durham, N.C.

'32

Brigadier General **Clarence Renshaw,** XVII, retired in December from his position as director of military construction in the Office of the Chief of Engineers. This completes 31 years of active service in the Army. He plans to continue an active career in construction and will remain in Washington. One of his lasting monuments is the Pentagon, for which he was in charge of design and construction just prior to World War II. He also commanded the Northeast District of the Corps of Engineers which built the Arctic air base at Thule, Greenland. Here is one of the most widely travelled men of our class, with construction assignments from the Philippines to Panama, the United States and Europe.

Our reunion plans are coming along quite well. A meeting was held in December at the M.I.T. Faculty Club, with **Tom Sears, Ed Nealand** and myself as the reunion committee. This committee will be expanded within the next year. Tom Sears has been selected as chairman by our President, **Bob Semple.** We have decided to hold the reunion on Cape Cod and have selected Chatham Bars Inn as our meeting place. We are sure you will have a wonderful time there, based on the past experiences of other classes that have raved about it to the Alumni Association. Tom and Ed have made a personal reconnaissance of the Inn and have everything well in order.

Carroll Wilson, XV, is on another trek to Africa for a couple of months. This time the Ford Foundation is sending him through the middle belt of Africa, from the Indian Ocean to the Atlantic. . . . Several members of the Freshmen Class this year are sons of members of the Class of 1932. They are: Alan Craig Leslie, son of **John William Leslie;** Peter Broomell Rhines, son of **Thomas B. Rhines;** Robert Francis St. Aubin, son of **Leo Francis St. Aubin;** and Donald More Stewart, son of **Richard M. Stewart,** and grandson of Vernon T. Stewart, '15—**Rolf Eliassen,** Secretary, Room 1-138, M.I.T., Cambridge.

'34

This month the pickings seem to be a little less in volume than before, but here goes with what we have. **George Priggen** has been kind enough to send along the following about his recent activities. Incidentally, this is the first contact I have had with him in 26 years. "Let it suffice to say that I am presently engaged as general manager of our Kansas City Division at Kansas City (Mobil Oil Company). This division covers all or part of eight states in the Middle West from Wyoming and Colorado on the west to Tennessee on the east. My work, as you undoubtedly know, is in the general marketing of petroleum products including supply, distribution, marketing, investment, and all of the other things normally associated with this effort. Noting that you are writing from St. Louis, I would hope that an opportunity would present itself to visit with you since just recently we established a new office in the Page Industrial Center as headquarters for our Greater St. Louis, eastern Missouri, southern Illinois, and Tennessee operations. This function is under the direction of our Kansas City office and represents an endeavor that is high on our list of priority for successful execution."

In case any of you have missed its establishment, there is an M.I.T. Club of New York, with headquarters at the Biltmore Hotel. Perhaps this would be a good place for us to hold a "Junior" reunion one of these years. Incidentally, the dues are only $12.50 annually for out-of-town members.

By the time you read these notes the M.I.T. contingent of our Class Secretary team, **Mal Stevens,** will have been on leave from the Institute for a couple of months. He is plunging into fibre glass reinforced plastic manufacturing with another of our classmates, **John Westfall,** of Westfall-Chafee Laminates, Barrington, R. I. For the time being Class Notes material can still reach him through his M.I.T. office.

There must be more active Class of 1934 readers of the Technology Review than is evidenced by the information that we are able to collect once every month. Please do send us some sort of data once

in a while. It is interesting to hear of your classmates.—**Harold E. Thayer,** Secretary, 415 West Jackson Road, Webster Groves 19, Mo.; **G. K. Crosby,** Secretary, Longwood Road, Huntington, West Virginia.; **M. S. Stevens,** Secretary, Patent Section, Room 20B–131, M.I.T., Cambridge 39, Mass.; **J. P. Eder,** Secretary, 1 Lockwood Road, Riverside, Conn.

'35

Our Class now has 24 Secretaries at work! Ten more District Secretaries on the job. Here they are: **Dick Shaw,** Hartford, Conn.; **Ed Loewenstein,** Greensboro, N. C.; **Art King,** Louisville, Ky.; **Jack Ballard,** Milwaukee, Wis.; **Ned Collins,** Gary, Ind.; **Charlie Debes,** Rockford, Ill.; **Peter Grant,** Cleveland, Ohio; **Johnny Mooring,** Bellevue, Wash.; **Bud Pflanz,** Albuquerque, N. M.; and **Stanley Lane,** Helena, Mont.

Dick Shaw writes: "I see **Sam Fox** and **Dick Hughes** occasionally as they are here in West Hartford, and during the winter I can count on finding **Whit Stueck** on top of some ski area or other several times a season. I have also met Johnny Westfall, '34, the last couple of winters under the same circumstances."

Ed Loewenstein writes: "My doings have ranged from drab to exciting. After practising architecture in Highland Park, Ill., and Chicago for the years before the War, I got shipped by the Army to North Carolina and except for some years overseas and digressions to Texas and Missouri, I've been here ever since. I had a very sad few hours in 1944 when I boarded the large engineer supply ship, 'Robert M. Emery' and saw all of our crew pictures in the pilot house in memory of Tuffy . . . it was in the Pacific at that time. At this sitting I have one wife, three children, one dog, two horses, one boat, few ailments, less hair, and the usual business worries. I ride a motorscooter due to the parking situation here and the need for fresh air, but last week it got run over by a truck when the service garage man was taking it to be repaired, so this week I'm either mounted on foot or wilting in an auto. In addition to the architectural business, I'm a part-time member of the art department faculty of the Womens College of the University of North Carolina, which is located here in Greensboro. I've been doing some work for the M.I.T. Educational Council and greatly enjoying it for the past few years. It is a fine organization and does a good job. My boating activities have changed from sailing, which is very hard here, to motorboating (I have a new 21-ft. Owens express cruiser) and I do a lot of water sightseeing and exploring, fishing, water skiing and cruising. We have fabulous water here in North Carolina and there are endless places to go: inland waterway, big sounds, Outerbanks, Hatteras and Ocracoke areas, and the ocean." Ed invites any classmates who get down to the Greensboro area to drop by and see him.

Art King in his acceptance letter as a district secretary writes: "There are just two items which might qualify as out-of-the-ordinary activities. First, I participated in a most interesting and stimulating two-week seminar, this past August, in Aspen, Colorado, as a panel member of the executive program conducted by the Institute for Humanistic Studies. Among the participants was M.I.T.'s Doctor Killian, who was there with Mrs. Killian. (My wife, Nancy, accompanied me.) Other participants included Charles H. Bohlen of the State Department, Supreme Court Justice Brennan, plus about 20 other individuals representing a cross section of industry and the professions from all over the country, and even from foreign countries (India and South Africa). The second item concerned my first venture into politics. I served as treasurer of the Republic Campaign Committee for Louisville. Apparently, our efforts were reasonably successful, since we turned in a majority for Mr. Nixon and for our Republican Senator, John Sherman Cooper. We did miss out by a handful of votes on getting a victory for the Republican candidate for Congress."

Charlie Piper now lives at 26810 Fond du Lac Rd., Rolling Hills, Calif. (It's no wonder I couldn't find him last July—my search was 15 to 20 miles north.) He wrote to **Ham Dow,** South Shore District Secretary, as follows: "After leaving the Institute I had a number of jobs in the New York area, mainly in the field of electronics, up to about 1945, at which time I began getting into servos and missiles. I met Jean Erickson in New York and we were married in 1941. We have no children. In the spring of 1948 I joined the Research Laboratories of the Bendix Corp. in Detroit, and have been with Bendix in some capacity ever since. My first important project was a meteorological rocket which had digital data telemetered from the bird and automatically typed out on the ground. This was completed in 1951. From then until 1955 I developed several analog and digital computers, but nothing very earth-shaking. Beginning in 1956 I was assigned to the Central Office as Assistant to the V. P. Engineering. This was a staff job and so when I had the opportunity to join the Computer Division in 1959, I took it. I am manager of applied mathematics responsible for developing programming systems for the G-20 and other digital computers made by the division."

George Agnew is another Californian. He lives with his wife, Anstes, and his children, Carson, 11, and Duncan, 8, at 1155 Savoy St., San Diego 7. George is manager, Manned Aircraft, Ryan Aeronautical. . . . Two of our classmates are members of the M.I.T. Club of Mexico: **Hippolyte Gerard** and **Fernando Gallardo.** It will soon be Fiesta time again at the M.I.T. Club of Mexico City. I understand from those who have attended—it usually comes in March—that they have a wonderful time. If you can arrange a vacation trip to include it, by all means, do so.

Space Technology Laboratories, Inc., has appointed **David B. Langmuir** to the post of director of its physical research laboratory. He will also continue in his present duties of similar capacity at the Ramo-Wooldridge Division. . . . **Beverly Dudley** is now associated with Laboratory for Electronics, Inc., Boston, in the Advanced Development Division. Bev missed out attending NEREM this year for the first time since he was associated with its organization in 1947. NEREM is the Northeast Electronics Research and Engineering Meeting of the Institute of Radio Engineers held in Boston each year in mid-November. From an exhibitor's viewpoint this affair is excellent. Atlee Corporation regularly makes more productive contacts at NEREM than any other show, including the New York I.R.E. and Wescon. . . . **Leo Beckwith,** Class President, was a panel speaker at the Industrial Symposium on "Growth Through New Products" held recently in Boston under the sponsorship of Quantum, Inc.

Jack Orchard, our energetic, dynamic District Secretary from Silver Spring, Md., has come up with a new approach to getting news from reluctant classmates: produce startling news yourself and cash in on the reactions! Here's how Jack describes it: "I got one piece of news which, like Browning's Last Duchess 'is a rarity.' At a time when all the other thirty-fivers are expectant grandfathers there's one stoop in the class who don't know when to stop. See enclosed announcement. Maybe we should run a contest and award a 'World's Greatest Lover' plaque to that '35er who sires the latest prospective M.I.T. graduate. Matter of fact (if you think there's any mileage in this) I'll buy the plaque and hang it in my office, and will forward it suitably engraved to the next winner." The "announcement" is the arrival of James Arthur Orchard, number six of the young Orchards, born November 15, 1960. The plaque is waiting for the next father in the class so please keep us up-to-date.

One of the "reactions" came from **Morris Goodhard** who spent only his first year with us before going on to Johns Hopkins. He adds: "However, I couldn't resist your letter, partly because of its unusual heading (Not an Appeal for Funds), and partly because I hate to waste stamps and I couldn't steam the one off this envelope!" . . . Another "reaction" came from **Albert Sanderson** who lives at 503 W. Main Street, Fairfax, Va. He writes: "Am currently special assistant to the Director of Procurement, Office of the Deputy Chief of Staff for Logistics, U. S. Army. Conduct special statistics on procurement and production operations of the Army. Received the Army's Exceptional Civilian Award a couple of years ago for one classified study. Have one wife but no children."

As I write these notes, Boston is recovering from its first snow storm—a real old fashioned blizzard—cold (12°), windy, and lots of snow (10 to 14 inches) with drifts. But it won't be long until golfing weather will be with us again—you lucky devils who can play all year round. **Art Marquardt** and I have talked briefly of organizing a class golf tournament to see who the class champion is. It would be carried on by mail with certified scores. If you are interested, let us

know, for all we have presently to go on is the Reunion Book and whether you show golf as one of your hobbies. Let us hear from you anyway. Contact your nearest secretary, now: **Edward C. Edgar,** Kerry Lane, Chappaqua, N. Y.; **Hal L. Bemis,** 510 Avonwood Rd., Haverford, Pa.; **Elmer D. Szantay,** 6130 N. Kilbourn Ave., Chicago 16, Ill.; and **Gerald C. Rich,** 673 Rosita Ave., Los Altos, Calif., Regional Secretaries.—Class Secretary, **Allan Q. Mowatt,** 11 Castle Road, Lexington 73, Mass.

'39

Dr. **Howard H. Reynolds,** X-Grad., formerly manager of the Technical Department of the Cryovac Division of W. R. Grace & Company, Cambridge, Mass., has joined Ludlow Papers, Needham Heights, Mass., as director of research. Howie, a graduate of Harvard before getting his doctorate at M.I.T. in '39, is active in the Boston sections of both the American Institute of Chemical Engineers and the American Chemical Society. . . . **Paul N. Stanton,** II, has been named vice president of marketing for Pratt & Whitney Company, a subsidiary of the Fairbanks Whitney Corp. Paul and Theodora, with daughter Carolyn, are now living in West Hartford, Conn. Before taking up his new assignment with Pratt & Whitney, Paul served as general sales manager for the Clearing Machine Corp., of Chicago, and prior to that position had managed sales activities for La-Pointe Machine Tool Company, Hudson, Mass. Paul is a member of the National Machine Tool Builders Association, the American Society of Tool and Manufacturing Engineers, and the American Society of Mechanical Engineers. . . . **John William Mohlman,** X, is Technical Associate at the Whiting Research Laboratories of Standard Oil Company (Indiana). Bill finished in '39 at the Institute, and then went on to get his master's degree, also in chemical engineering. The Mohlmans live at 1073 West 107th Street, Chicago.

Dr. **Jerome Gross,** IX-A, Assistant Professor of Medicine at the Massachusetts General Hospital, and a member of the Faculty of Medicine at Harvard University, was among 32 contributors to a monograph on "Calcification in Biological Systems" published recently by the American Association for the Advancement of Science. This 22-chapter, 500-page monograph deals comprehensively with the mineral deposition in living matter within a whole spectrum of biological systems, ranging from single cells to man. . . . **Henry R. Landwehr,** X, has been appointed superintendent of Allied Chemical's molding compound plant at Toledo, Ohio. Operated by Allied Chemical's Plastics and Coal Chemicals Division, the plant produces melamine and urea molding compounds. Henry and his family live at 1128 Wooster Street, Bowling Green, Ohio. . . . **Edwin M. Tatman,** XV, is now manager of the San Francisco District Sales Office of Aluminum Company of America. Ed's district embraces all of California and Nevada, north of Santa Barbara County. His new responsibilities include the activities of Alcoa's Oakland, Calif., branch sales office and of Rome Cable Corporation's regional sales office. Ed has been steadily moving up in Alcoa activities, and has served in Boston, Kansas City, Wichita, Detroit, Grand Rapids, Evansville, and Cincinnati.

Here are two '39 sons in the current Freshman class at M.I.T.: John Hayes Howard, Jr., son of **John H. Howard,** VI-Grad.; and James Hackstaff Hunicke, son of **August Bryon Hunicke,** II. . . . **Norris F. Dow,** XVI, is an Engineering Consultant on Structural Systems for the Missile and Space Vehicle Dept., Space Sciences Lab., of General Electric Company. This information came to light as a biographical note to an article written by Norris in the May '60 issue of Aero/Space Engineering. The article is entitled "The Ionizing Radiation in Space-Structural Implications." The biographical note further tells us that Norris did graduate work at Brown University, the University of Virginia, and Virginia Polytechnical Institute, after getting his bachelor's degree in aeronautical engineering at the Institute in '39. Prior to joining General Electric, Norris spent 16 years in the Structures Research Division of NACA. He is a member of the IAS, ARS, Society for Experimental Stress Analysis, and Franklin Institute. . . . Capt. **Walter E. Baronowski,** USN, XIII-A Grad., is supervisor of shipbuilding, U. S. Navy, at the Bath Iron Works, Bath, Maine. Walter graduated from the Naval Academy in 1934, had two years of sea duty, and then spent from '36 to '39 earning his master's degree in Naval Architecture at M.I.T. Walter and Frances Baronowski are now living at 933 High Street, Bath. His prior assignment was that of production officer for the Portsmouth, N. H., Naval Shipyard, where were recently built the Polaris submarine Abraham Lincoln and the nuclear submarine Thresher. The Baronowskis have one daughter, Eleanore.

George L. Williams, XV-Grad., is president of M and C Nuclear, Inc., a subsidiary of Texas Instruments, Incorporated. M and C is located in Attleboro, Mass. George did his undergraduate work at Lafayette College, Easton, Pa., before coming to M.I.T. to get his master's in business and engineering administration in '39—**Oswald Stewart,** Secretary, 31 Birch Road, Darien, Conn.

'40

It is with regret that I must record the death of two more classmates. **William P. Ready,** formerly of 1234 S.E. 12th Way, Fort Lauderdale, Fla., died on May 24, 1960. . . . **Tom McElrath** died on November 6, 1960. I am indebted to **Dave Fleming** for a brief account of Tom's activities since leaving Tech. Dave also has included a few notes as to his own welfare.

"This is the first time that I have corresponded with you since graduating from Tech some 20 years ago and circumstances in this instance are unfortunate. Tom McElrath passed away suddenly on Sunday, November 6, as a result of an acute coronary occlusion and I promised his wife I would write to you so that appropriate mention could be made in the Alumni section of the Technology Review. As you may recall Tom was in mechanical engineering and in his senior year was selected for the honors group which went on to take their masters degrees. Upon leaving Tech in 1941 Tom accepted a position with the Linde Company, Division of Union Carbide Corporation, at the Development Laboratory, Newark, N. J. Actually both Tom and I took positions here in Newark at the same time. Tom's early work with the company related to mechanized gas welding and he was one of the first men assigned to the development of the Heliarc welding process in the middle 40's. Tom made many important contributions to the inert gas welding processes which have assumed widespread industrial acceptance and importance. At the time of his death he held the position of special projects engineer, and was a key man in Linde's welding development effort. Tom resided at 6 Western Avenue, Chatham, N. J., and is survived by his wife, Peggy, a daughter, Cheryl, and a son, Ronald.

"As long as I am writing this letter, I will include a few secondary remarks about the Fleming family who also reside in Chatham. Both my wife, Elaine, and I had looked forward to attending the 20th Reunion but events conspired against us. Our fourth child and first son was born early in July, so you can appreciate that the travel and festivities related to the reunion dictated against participation. There were many familiar names among the list of those attending and I sincerely regret missing the opportunity for renewing old acquaintances. However, the 25th Reunion is not so far away and we will be there. At Linde my position is manager—Gas Products Development. This work is concerned with processes and related equipment which will expand the use of oxygen, nitrogen and argon, particularly for large scale metallurgical applications."

Jerry McAfee has been appointed vice president-executive technical advisor of Gulf Oil Corporation. Previously he was vice president-engineering for the manufacturing department. Jerry has been with Gulf since 1945. . . . **Schrade Radtke** is in the limelight as the result of three new developments in zinc lithographic plate-making under his direction of the American Zinc Institute's expanded research program. The first development is a simple and inexpensive technique for producing an ultra fine grain on zinc litho plates equalling or exceeding the fineness of any grain previously obtained on other materials. At the same time there is automatically applied a corrosion protective film to the zinc plate during the graining cycle. The second development is a new wipe-on diazo coating for zinc that is practical and easy to apply while the third development is a one-step ink developer that, after photographic exposure through a negative,

develops image and inks it while desensitizing the non-image areas at the same time. This eliminates one plate-making step and speeds up production. —**Alvin Guttag,** Secretary, Cushman, Darby & Cushman, American Security Bldg., Washington 5, D.C.; Dr. **Samuel A. Goldblith,** Assistant Secretary, Department of Food Technology, M.I.T., Cambridge, Mass.

'41

Some of you may have seen **Ray Ketchledge** on television in the Bell Telephone commercials. Ray is heading a group working on components for the new electronic central office, an installation which will add many new dimensions to telephone service. For example, if you find your number busy, dialing in a code number will automatically keep trying the number until it is free. Or, if you wish to have your calls transferred to another number, dialing another code will provide that service until you return to your own phone. . . . **Bob Wooley** has been named manager of the armaments section of General Electric's Light Military Electronics Department at Johnson City, N.Y.

Other news is pretty thin this month, although a rundown of the '41 men active in the Alumni Association is interesting. The Directory of the Association, just issued, lists the following: Bill Ahrendt, member at large, and Reid Weedon, class representative, on the Alumni Council; Ed Beaupre, representing the Portland, Maine, club on the Council; Ed Marden, the same for St. Louis (this does not imply residence in the area where the club is located). Serving on the departmental visiting committees noted are Bob Sinsheimer, Biology; Herman Affel, Physics; Davis Dewey and Ted Walkowicz, Economics and Social Science; Joe Bowman, Earth Sciences; and Nathaniel Rochester, Modern Languages. Serving as local M.I.T. club officers in the far corners of the country are Warren Meyers, Chicago, secretary; Joe Bowman, Denver, president; Bill Hargens, Philadelphia, vice president; Herb Moody, Philadelphia, secretary; William Summerhays, Rochester, N. Y., treasurer; and Harold Radcliffe, Tampa, secretary. Also giving generously of their time as honorary secretaries or educational counselors in maintaining friendly relations with the local secondary schools and interviewing prospective new Tech men are: David Thurlow, Birmingham, Ala.; Jim Cullison, Palos Verdes, Calif.; Clifford Moffet, San Francisco; Joe Bowman and Norton Polivnick, Denver; Lew Fykse, Bristol, Conn.; John Purinton, Middlebury, Conn.; Harold Radcliffe, Gulfport, Fla.; Warren Meyers, Winnetka, Ill.; Luke Hayden, Pittsfield, Mass.; Bob Meier, Hazel Park, Mich.; Laurence Russe, St. Louis; Ed Beaupre, Nashua, N. H.; Carl Mueller, Ridgewood, N. J.; Porter Evans, Tenafly, N. J.; Joe Gavin, Huntington, L.I., N.Y.; Ralph Wilts, New York City; Howie Samuels, Canandaigua, N.Y.; William Summerhays, Rochester, N.Y.; Bill Orr, Pisgah Forest, N.C.; Herb Moody, Huntington Valley, Pa.; Herman Affel and Bill Hargens, Philadelphia; Hank Avery and Knut Johnsen, Pittsburgh; Cranston Gray, Greenville, S. C.; Frank Storm, Amarillo, Texas; David Moffat, Salt Lake City; and Bob Blake, Falls Church, Va.—**Ivor W. Collins,** Secretary, 9 Sunnyside Drive, Dalton, Mass.; **Henry Avery,** Assistant Secretary, Pittsburgh Chemical Co., Grant Building, Pittsburgh 19, Pa.

'42

The press reports continue to pour in about the fine music that **Robert H. Rines** wrote for the New York show, "Drums Under the Windows." The Boston Globe ran a two and one-half column story under an eight column head quoting highly favorable reviews by Howard Taubman of the New York Times and several other New York critics: "There is joy in every song;" "highly memorable Irish airs;" "lyrical images fly from earthbound reality;" and more in the same laudatory vein. The Cherry Lane Theater is at 38 Commerce Street, New York City, telephone CHelsea 2-4468. Further biographical information turned up in the recent newspaper articles that goes beyond the story reported last month and in the Notes of April 1958. It seems that the wartime show for the Royal Artillery in England included a song, "I Just Won't Be Lonely," which made the hit parade. The profits were turned over to the British Red Cross. In the realm of church music the hymn, "Unity Eternal," is now part of the hymnal of the First Church (Unitarian) of Belmont. Bob and his associate in recent compositions, Kermit Morrissey (assistant to the president of Brandeis University), also collaborated on two popular songs, "My Destiny" and "Winter Cheer." In addition to his patent law practice Bob has used the material from his lecture series at the Harvard Law School to write a book on patent law. Publication is scheduled for the late spring of this year. Then, if time permits, he and **Harry Heineman** (also in our class) plan to rewrite their local show, "Nothing So Important," as a professional show entitled, "Nothing But A Dream."

Some statistical notes from the Alumni Fund: In the past 18 years our class has contributed $95,534, one-eighth of it ($11,959) in the past year; the 346 classmembers who contributed, and receive these Notes, constitute 45 per cent of our active class roll; and the average contribution was over $30. We join Class Agent **Charlie Speas** and Assistant Class Agent **Bill Herman** in urging all readers who have been below the class average to raise their sights for '61 to the slightly more than half-way figure of $31.

Publicity material is being turned out in fine style by the pseudo-Madison Avenue folks in the M.I.T. Club of New York. If I weren't so fortunate as to have both parents and in-laws in the city with whom we can stay (and upon whom we can deposit our children), I, too, would snap up the bargain membership for out-of-towners. At $12.50 a year it's a real deal—the Biltmore Hotel, 43rd Street and Madison Avenue. **Harvey Kram** is one of the directors. Call him or the Club when next in town to find out more about the cocktail bar, full-time secretary, other facilities from 10:30 A.M. to 7:30 P.M., and for the less adventurous—lunch.

Promotion to Rear Admiral: **David Frederic Kinert,** now in Burlingame, Calif., from Washington, D. C. . . . Long distance move, also from the east coast to the Pacific: **Maurice T. Ireland,** now of Los Altos, Calif. . . . Other changes of state were made by **Mrs. Kenneth R. Williams** to Landenberg, Pa.; Dr. **Robert B. Norris** to Storrs, Conn.; and **Thomas P. Condron** to Natick, Mass. . . . Our best to all from **Edmunds, Keating, Quinn & Rosenblum.**—**Lou Rosenblum,** Secretary, Tech/ops, Burlington, Mass.

2-'44

This past week I ran into a number of the 2-44 men in the area, partly by accident, and partly by design to obtain news for the notes.

While over at Arthur D. Little in Cambridge, I ran into **Jay J. Martin,** who advises that he is still located in Belmont. He is director of Supporting Services for the organization, and advises that as of the moment, he is quite busy putting up two new buildings, and making plans for the erection of a third. For recreation, Jay and wife Tink have a place in New Hampshire which is just close enough so that they can run up there both in summer and winter. Also saw **Bob Almeida** who is business manager of the R & D Division. Bob is living in Wakefield where he says that he can be just far enough away from the office, and yet be at the office in 20 minutes from the time he leaves the house. Bob says that he hasn't been doing much travelling lately, but during the last year he has run into **Jim Ruoff,** who is in Rochester with Kodak and is working on process development of films, and **Bob Kratz,** who is doing R & D work with Koppers Company in Varona, N. J.

While at the Institute yesterday, I was able to see **Mal Kispert** who is now Vice Chancelor, and is working directly for President Stratton. He advises that if any of you are around, he would be very happy to see you when you visit the Institute. He is living in the small town of Dover, which he says is excellent for raising his four children, tho a bit countrylike since the total population amounts to 2800 people. **Tom Carmody** had been in to see him a couple of weeks ago while at Tech doing some recruiting for Carbide. Tom's office is in New York City, but I didn't get his home address, unfortunately.

Talked to **Lou Demarkles** on the phone, and he says that he is quite busy running Associated Engineering Corp., in Brookline. Lou ran into **Bob Barnaby** on the Cape this past summer. Bob is with NBC, and is connected with capital bud-

get operations for the company. Bob is to be remembered as the owner of the 30 watt hi-fi set that was used for reveille at the Senior House when it was used by the ROTC group just after World War II. Just to keep things in the class, **Frank Chin** is Secretary Treasurer of Associated Engineering.

A nice note from **Bob Bartz** brought along a brochure describing Associated Rocky Mountain Universities Inc., of which he is Director. The purpose is to pool the technical resources of colleges in eight States to better work on R & D problems. Bob and Rosemary are living in Boulder, and Bob has been doing a fair amount of travelling lately, having been on the East Coast at least a couple of times recently.

The mail brought in the 1960-1961 Directory of the Alumni Association, and in glancing through it, I notice that the Philadelphia M.I.T. Club has **Bob Fisher** of Narbeth as assistant secretary; **Lee Eagleton** living in Moorestown, N. J. as treasurer, and **Joe Lester,** who is living in Wilmington, Del., as assistant treasurer. For those of you who might be able to make it, meetings are held in October, January and April. . . . The Annual Report of the Alumni Association shows that 45 per cent of the class members of 2-44 contributed, which is 10 per cent higher than the total alumni average. I certainly hope this will climb as the Second Century Fund rolls into high gear. One final plea, how about increasing the batting average on notes to your secretary? —**P. M. Heilman,** Secretary, 131 Lindbergh Ave., Needham, Mass.

'45

The Technology News Service and other sources of information have been sadly neglected these past several months as we have devoted our columns to drumming-up our 15th Reunion and then in November and December reporting the highlights of the Reunion. Here we go at random.

Dr. **W. Wai Chao** was appointed Director of Research and Development at Vickers, Incorporated, Division of Sperry Rand Corporation, early last August. Dr. Chao joined Vickers in 1959 as Chief of Research. Prior to Vickers, Chao directed engineering efforts for such projects as the second stage liquid rocket engine for the "Discoverer" program and altitude control rocket systems for "Project Mercury" and the X-15 airplane. Dr. Chao received a B.S. M. E. degree from National Tung-Chi University in China, and his M.S. and Sc.D. degrees at Tech. . . . Dr. **Jay W. Forrester,** Professor of Industrial Management, had the opportunity and privilege to accompany Major General A. M. Minton, the Air Force's Director of Civil Engineering, on a 11,000-mile, nine-day orientation flight of the Air Force's construction activity and defense line in the Far North last summer. Leaving from Bolling in Washington, D.C., the group's flight took them to Frosbisher Air Base on Baffin Island, Sondrestrom and Thule in Greenland; Cape Perry on the Arctic Ocean as well as several bases in Alaska. From Sondrestrom, a visit was made to one of the DEW extension sites on the Greenland Icecap. At Thule the group examined the mammoth Ballistic Missile Early Warning System (BMEWS) installation with its football field size antenna. At the Arctic construction sites the guests examined engineering problems and construction techniques on perma-frost and glacial ice deposits. . . . **Don K. Kuehl,** a research engineer at the Research Laboratories of United Aircraft Corporation in East Hartford, Conn., presented a paper entitled "Laminar Burning Velocities of Propane Air Mixtures" at the Eighth International Symposium on Combustion held at Cal Tech in late August. Don is a major in the U.S. Army Reserve serving in the headquarters of the 76th Division. . . . About a year ago (nothing like promptness) **Larry King** was promoted to the position of sales manager by Transitron Electronic Corporation in Wakefield. Larry is directing the overall sales efforts of Transitron's 19 sales offices throughout the country.

Class President **Dave Trageser** was appointed manager of domestic sales at High Voltage Engineering Corporation the middle of last summer. . . . **Al Werner** was appointed general sales manager of the Semiconductor Division of Hoffman Electronics Corporation with headquarters in El Monte, Calif., early last May. As many of you know, Al has had considerable sales experience for he has held sales management positions with Raytheon Manufacturing Company and the New Products Division of Hughes Aircraft Company back here in the East. . . . **Dave Clare** was named production manager of Johnson & Johnson's Eastern surgical dressings plant in North Brunswick, N.J., last spring. Dave has been with J & J since graduation. In his new assignment Dave will coordinate production at the 700,000-square-foot surgical dressings and baby products plant, largest facility of its kind in the world. . . . **William P. Colman** has recently been appointed a senior research chemical engineer in process evaluation at the Stamford, Conn., Laboratories, American Cyanamid Co. Bill initially joined Cyanamid in '51 as a chemical engineer after several years at Aluminum Corporation of America facility at New Kensington, Pa. As many of you probably know, **Tom Stephenson** is currently plant engineer at this latter plant. . . . **Elwood T. Clapp** has just joined Sun Olin Chemical Company as a technical economist. Elwood worked for a time on the Manhattan Project and more recently has taught chemical engineering at the University of Maine and Bridgeport Engineering Institute.

Ed Stolz, our Pittsburgh correspondent, wrote in mid October primarily "to send a news clipping about Pete." No clipping was enclosed but we believe the Pete would be **Pete Schwab** of Sigma Nu and Voo Doo fame. Ed, now Vice president of the M.I.T. Club of Western Pennsylvania, has turned over the Treasurer's duties to Bill Humphreys, District Sales Manager of Westinghouse's Sturtevant Fan Division. If I were a member of the club I would want to start a financial investigation; on the other hand, it may not be necessary as the club has contributed for the first time to the M.I.T. Loan Fund. Ed was recently elected executive secretary of the Pennsylvania Society of Professional Engineers, Pittsburgh Chapter. . . . One of our Western Reunion Correspondents last spring was **Bob Hildebrand.** Unfortunately, Hilde did not produce any recruits but he did pass on the good wishes of **Clarence (Red) Howell, George Dvorak,** and **Kirk Drumheller.** Hilde and Ginny spent several weeks in Europe this past August and September as Bob presented a paper entitled "Entry from Space" at the Second International Congress of the Aeronautical Societies at Zurich, Switzerland, September 12-16. Now that winter is upon us, Bob and Ginny are temporarily relocated in Palto Alto, Calif., as Hilde is attending this year's School of Industrial Management, Sloan Program at the University of California.

Although Treasurer **Bill McKay's** financial report has not as yet been audited it would appear that some 102 classmates gladly paid their class dues last year. Yes, we will still accept monies at this late date! Send your check made payable to M.I.T. Class of 1945 to Bill at 6 Robert Road, Framingham, Mass. While on the vulgar subject of monies, let us not forget the Alumni Fund and Second Century Fund. February is a good month to pay, for the Christmas bills are over and the income tax bite is two months away.

A review of the 1960-61 Alumni Association Directory finds several '45-ers listed. Alumni Council: Bill McKay, Jerry Quinnan, Dave Flood, and Dave Trageser. Dave is currently Chairman of the Personnel Committee. Club Officers: Bill MacKenzie, Treasurer, Lehigh Valley; Mario Wunderlich, President, Guatemala; Bob Schumacher, President, Oklahoma. Educational Counselors: Jim Hoaglund, Julian Davidson, Vince Butler, Dave Flood, Warren Miller, Al Oxenham, Ed Stoltz and Kirk Drumheller. Let's add several additional names during this coming year.—**C. H. Springer,** Secretary, c/o Firemen's Mutual Insurance Company, 420 Lexington Avenue, New York 17, N. Y.

'46

We received an interesting article from the Delaware County (Pa.) Daily Times describing a talk on satellites given by **Alfred A. Little.** Al is project manager of the Discoverer Mark IV program of the General Electric Company missile and space vehicle department. In addition to his B.S. in Aeronautical engineering from M.I.T., Al has an M.S. in mechanical engineering from the University of Pennsylvania and an M.B.A. from Temple University. He worked for ten years in the Aeronautical Structures Laboratory in Philadelphia, and joined G.E. in 1956. He also teaches at Temple. Al is a LCDR in the USNR and is a member of the Institute of Aero-Space Sciences and

the Society of Experimental Stress Analysis. He has two girls and a boy, and lives at 461 Paxon Hollow Rd., Media, Pa. . . . **David R. Longmire** is an engineer with the Texas Butadiene and Chemical Corp. He lives at 4527 Pin Oak Lane, Houston, Texas. Dave is active as a member of the M.I.T. educational council. . . . Dr. **Ju Chin Chu,** Professor of Chemical Engineering at the Polytechnic Institute of Brooklyn, is in charge of investigations for an Army contract for basic research on fuel cells and related technology recently awarded to the Institute. Dr. Chu is nationally renowned in chemical engineering, having authored more than 50 papers and books, and served as consultant to many government agencies and industrial firms. He now spends the greater portion of his time in classroom and research activities at the Institute and he feels that the primary objective of a research program in a university is to help bright students to obtain their doctorate degree within a reasonably short time. Whoever is interested in doing advanced type of research in fuel cells and other related fields is asked to contact Dr. Chu for details.

Samuel Gusman is a Research Supervisor at Rohm and Haas Co., Philadelphia. He lives at 1538 Woodland Rd., Rydal, Pa. . . . **Sherman Naymark,** a Captain in the USNR, is manager, Fuels and Materials Engineering, in the Atomic Power Equipment department of General Electric in San Jose, Calif. He lives at 1736 Laurelwood Drive, San Jose. . . . **Thomas F. Malone,** Director of Research for Travelers Insurance Co., represented the U.S. at the International Assembly, International Union for Geodesy and Geophysics, in Helsinki last summer. . . . **Lawrence E. Nelson** recently changed jobs and is now Staff Assistant for Corporate Planning for Reynolds Metals Co. He lives at 5414 Windingbrook Rd., Richmond 30, Va. . . . **Douglas M. Surgenor** is Professor and Chairman of the Department of Biochemistry at the University of Buffalo School of Medicine, Buffalo 14, N.Y. . . . **Boman S. Chothia** is a consulting engineer in India. His home address in Wadia Building, 137 Queen's Rd., Bombay 1, India. . . . **John L. Wandrisco** is special assistant to the President of the Latrobe Steel Co., Latrobe, Pa. He lives at 844 Main St., Latrobe.

Clifford C. Woods, Jr. writes a note from his home at 47 North Ridge Rd., Old Greenwich, Conn., to say he hopes to attend the reunion this spring. He hopes the reunion location will be close to M.I.T. because he wants to have his family see the Institute. Cliff, our plans are for the reunion to be held on Cape Cod but they include transportation for those who desire it to get them to M.I.T. for Class Day and all the other special affairs and open houses, so we hope you and everyone else of like mind will join us in the social reunion for the weekend and then plan to visit M.I.T. with us on Monday following the reunion. . . . **Warren H. Turner** has completed his 10-months special course at the University of Pennsylvania and is now district engineer for the Jersey City, N.J., Bell Telephone Co. Warren lives at 49 Pierson Rd., Maplewood, N.J., is active in the Maplewood Lions Club, and is a trustee and past president of the Maplewood Glee Club. . . . **Charles A. Thompson** has been in the IBM sales department for the past five years and is now a special representative for them, recently transferred to Stockholm, Sweden. He is assisting in getting Swedish companies ready for computor installations. The Thompsons have two children and now make their home at Djursholmsvager 80, Naesbypark, Sweden. Anyone visiting Sweden is cordially invited to drop in. . . . **Wes W. Goodnow** is product development supervisor for Wright Hoist Division of American Chain and Cable Co. As chief plant engineer he reorganized the plant engineering and maintenance activities of the division including a facility study and layout projected 20 years ahead. As Staff Engineer he was responsible for the design of a new laboratory for structural test equipment to test hoists. As Product Development supervisor he is reorganizing the product development activities of the Division. He is interested in trading ideas with others of the class active in product development. Wes is active in the local SPEBSQSA (barber shop quartet) and lives at 1460 Hollywood Parkway, York, Pa. . . . **John H. Fleming** is in the Sales Department of the Coal Machinery Division of Joy Manufacturing Co., and lives at 1419 N. Country Club Circle, Carlsbad, N. M. . . . **Theodore S. Church** is manager of the Electronic Devices Department of Sandia Corporation. He makes his home at 2957 Wisconsin St., N.E., Albuquerque, N. M. . . . **Robert J. O'Donnell** is a petroleum refining engineer with the California Research Corp., and lives at 2190 Danberry Lane, San Rafael, Calif. . . . That winds it up for this month. We hope to be back in March.—**John A. Maynard,** Secretary, 15 Cabot Street, Winchester.

'47

As this is your correspondent's first message for the New Year, let me start by catching up on some items which have been in my file for a considerable period. . . . Back in May of last year, notification was made that **Ed Kane** was appointed sales manager of Kahn and Company. He was formerly division sales manager of the Cuno Engineering Corporation, and is a past president of the M.I.T. Club of Hartford. Ed is presently residing in West Hartford with his wife and family. . . . **Al Parziale** was mentioned in an article concerning the top personnel at the AC Spark Plug Division in Wakefield, Mass. Al is director of the project group there, and was a member of Course VI. His group is responsible for the instrumentation, design, and development of complete navigation systems and for developing them into prototype models for transfer to their production engineering department. Al has been married for quite a few years, and at present has three lively sons.

James R. Weiner is vice president for Engineering for the Philco Corporation's Government and Industrial Group, located in Philadelphia. Mr. Weiner did graduate work at M.I.T. in 1947, and before joining Philco was associate director of research at the Lockheed Missiles and Space Division located in Palo Alto, Calif. This Lockheed division did communications and control systems work on the Discoverer, Samos, and Midas programs. . . . In a recent issue of "Today's Living," an article concerning the Control Systems on Space Vehicles included plaudits for **Lawrence Levine,** a partner in the Belock Instrument Corporation in New York. The article concerns the application of inertial guidance systems to Intercontinental Ballistic Missiles, and the part that the Belock played in this development. . . . We have received a letter from **John W. Peirce** announcing that he has formed a partnership for the practice of architecture under the name of Gulesian, Peirce and Pierce, which will be located in Boston. **Walter S. Pierce,** the second partner, is also a member of the class.

Miscellaneous news includes a letter and detailed information from the M.I.T. Club of New York, Inc. **Howard Bollinger,** '43, has sent detailed information concerning the programs and objectives of the club, and has indicated that the non-resident membership fee is $12.50 per year. Considering the extensive program which is planned for the club, this fee is a nominal one. Anyone interested should contact Mr. Bollinger at the M.I.T. Club whose address is the Biltmore Hotel, New York 17, N. Y. . . . For any of you who have not yet contributed to the 1961 Alumni Fund, please do not delay. . . . Start thinking about the 15th Reunion, to be held in June, 1962. It is less than 18 months away, so focus your eyes on the week-end of June 8, 9 and 10. You don't have to send anything in at present, just start saving your money.—**Arthur Schwartz,** Secretary, 8355 Blackburn Avenue, Los Angeles 48, Calif.

'48

A personal letter from **Syd Tilden** informs me that he and his family are still living in Brookville, N. Y. on Long Island. They have two sons, Scott, 10, and Dean, four. . . . On November 29, **Ken Brock, Joe Yance,** and **Bob Bliss** met to select a chairman for the class dinner to be held on April 8, 1961 in connection with the M.I.T. Centennial Celebration being planned for that weekend at the Institute. . . . **Dick Snow,** who was named chairman of the committee for the dinner, is a native of Haverhill and now resides in Marblehead. He is with the B. F. Goodrich Company in Watertown and has played an active role on the M.I.T. Alumni Council. Watch this column each month for further details concerning the class dinner.—**Robert R. Mott,** Box 113, Hebron, Maine, Assistant Secretary; **Richard H. Harris,** 26 South St., Grafton, Mass., Secretary; **Herbert S. Kindler,** 128 Elatan Drive, Pittsburgh 16,

Pa., Assistant Secretary; **Harry G. Jones,** 94 Oregon Ave., Bronxville, N. Y., Assistant Secretary.

'49

Paul T. Reynolds (S.B. Course XVII, 1949) was married to Miss M. Helen Cayer on November 12, 1960, at the North Attleboro Sacred Heart Church. The bride is a graduate of the Academy of Jesus and Mary and the Truesdale Hospital School of Medical Radiology, Fall River. After a wedding trip to Florida, they will live in Boston. . . . **William J. Ryan, Jr.,** (S.B. Course XV, 1949) has been appointed head of the technical methods division in the Engineering and Construction Organization of the Boston Edison Company. He has been with the company since 1949 and has been a supervising engineer since 1953 . . . . We will hold the information on ten other '49ers until next month due to the pressure of a missed deadline.—**Frank T. Hulswit,** A. D. Little, 35 Acorn Park, Cambridge 40, Mass.

'50

Kenneth H. Olsen of Bedford, Mass., has been named Outstanding Young Electrical Engineer of 1960 by Eta Kappa Nu Association, National Electrical Engineering Honor Society. Ken received his B.S. and M.S. degrees in Electrical Engineering from Tech. After graduation he was a staff member of the Digital Computer Laboratory and supervised the group responsible for the first digital computer to use magnetic core random-access memory. In 1957 Ken founded and became president of Digital Equipment Corporation which created and marketed transistorized building blocks for the computer industry. . . . In November, **Richard P. Price** announced the establishment of engineering offices and laboratories named The Price-Cleveland Corporation in Cleveland, Ohio. Dick is well known for his development of missile programming equipment used in the successful launching of Vanguard I and Vanguard II earth satellites. Until recently he was project manager of Designers for Industry, Inc. and formerly was associated with Westinghouse Electric Corporation in Pittsburgh, Pa., where he assisted in development of the reactor controls for the USN Skate, second U. S. atomic-powered submarine. Dick's firm will design, develop and manufacture new electro-mechanical instruments, scientific machinery and advanced manufacturing and test equipment under various contracts with leading local and national manufacturers.

Henry A. Johnson of Lexington, Mass., joined the Dewey and Almy Chemical Division, W. R. Grace and Company, in Cambridge, as Development Chemist in the Textile Printing Blanket Laboratory. He received his BS in Course X and formerly was with the B. F. Goodrich Footwear and Flooring Company in Watertown and also served with the A. C. Lawrence Leather Company in Peabody. . . . **H. K. Arnold** has been promoted to senior chemical engineer in the Technical Division at the Baytown Refinery of Humble Oil and Refining Company in Baytown, Texas. He is in the Applied Mathematics and Computing Section where he directs the utilization of electronic computing machines for improving the efficiency of processing operations. He is specializing in the application of modern mathematical methods to determine optimum use of raw materials and processing equipment to produce a wide variety of products that are manufactured at the refinery. . . . **Irvine F. Williamson** has been appointed Superintendent of Norton Company's Santa Clara California plant. He will assume his new responsibilities after a period of special training at the home office in Worcester. Irv joined Norton in '54 as an Industrial Engineer and was named assistant foreman of the Packing and Shipping Department in '56. In '57 he became assistant foreman of the Kiln Departments and in August of '59 was made a supervisor in the Industrial Engineering Department. Irv is is married to a young lady from Boston and has two children. His mailing address is 21 Eastwood Road, Shrewesbury, Mass., for some of you who may wish to write to him.

I hope each of you will drop me a note to up-date me further on your responsibilities and personal life. Looking forward to hearing from you all soon. Start the New Year off right; write me; visit me; or phone me! Your lonely secretary—**Gabriel N. Stilian,** American Management Association, 1515 Broadway, New York, N. Y.

'51

News, for once, is plentiful. The returns from the initial mailing for the tenth-year reunion not only show excellent prospects for a large turnout next spring, but also have brought in more news items than your secretaries know what to do with. There is, at this point, enough backlog to run through at least another issue after this one, and more is coming in all the time. . . . **Paul Coleman,** now Professor of electrical engineering and director of the ultramicrowave group at the University of Illinois, delivered a paper on "Bridging the Microwave-Infrared Gap" at an I.R.E. meeting in Chicago. . . . **Charles Neuman de Vegvar** was married on November 19 to Countess Szechenyi-Erdody, in Greenwich, Conn. . . . **Paul Hayner** addressed the Harvard Club (!) of Boston as part of a recent symposium concerning growth of new products. Paul is manager of the research department of Sanders Associates, Inc.

Lawrence McNeill is now living in Baldwin, N. Y., and working for Sperry Gyro at nearby Carle Place, N. Y. He is engineering section head for system coordination on the B-58 bombing and navigation system project. A new son, David Lawrence McNeill, was born last May. . . . **Tom McLaughlin** has just devised and perfected an ingenious piece of laboratory equipment known as the McLaughlin tilting platform tester, in connection with his work in the polychemicals department of DuPont's Wilmington plant. Tom and his wife Geraldine live in suburban Wilmington. . . . The I.B.M. Journal of July 1960 carried an article by **Constantine Melas,** entitled, "A Cyclic Code for Double Error Correction." Constantine is engaged in research on data transmission systems at the I.B.M. Advanced Development Division in San Jose, Calif. . . . A letter from **Dan Maxfield** tells us that he will be present at the reunion and that he is now with the civil engineering consulting firm of Porter, Urquhart, McCreary and O'Brien in Newark. Dan and his wife live in Rahway, N. J. and have two sons, Paul, six, and Karl, three and one-half. . . . **Russ Osborn,** who is currently president of the Merrimack Valley Chapter of the American Institute of Industrial Engineers, and chief industrial engineer at Cannon Electric in Salem, is living in Newbury, Mass., with his wife Rita and two sons, Kevin and Brian. Russ is an instructor in the U.N.H. Extension Service and A.I.I.E. representative to the Engineers Joint Council. . . . A notice in the Univac Engineering News mentions that **Bill Poland** was recently promoted to engineering director of one of the systems sections at the Remington Rand Univac plant in Norwalk. Bill and his wife Cricket have three children. The entire family are avid ski enthusiasts and make frequent winter weekend trips to the Berkshires. . . . **Orlo Powell** and Nancy Rolick were married last June in Rocky Hill, Conn. Orlo is a sales engineer with Crofoot Gears, in Cromwell, Conn. Less than a month before their wedding, Nancy received an M.D. degree from Yale. (There's nothing like having a doctor in the family.)

Harold Reed has joined the staff of the Badger Manufacturing Company, of Cambridge, a company which constructs plants and process units for the chemical, petrochemical and petroleum industries. . . . **Bill Rhoads** is serving as assistant director of the graduate training program at Williams College, where he is an assistant professor of economics. . . . We were very pleased to receive a copy of the newsletter sent out by the **Hal Siegel** family (Hal and Connie, Marc, Pamela, Brandy and Sandra). The newsletter is called "Twins, Inc.," and is sent out each time the Siegels produce another set of twins. So far, there have been two of these publications, and the one we got is over a year old; we have not heard anything yet this year, but we know Hal and Connie won't let us down. . . . **John Washburn** has been elected secretary and director of the Merrow Machine Company of Hartford, manufacturers of industrial sewing machines. . . . **Jack Wingard** is now living in Longmeadow, Mass., where he is vice president of T. A. Pearson Associates. Jack and his wife Patricia have four children, Scott, Deborah, Richard and Kim. . . . **Jim Wygant** who is now section head in engineering research at the Whiting, Ind., laboratories, Standard Oil Company, has been named

a fellow of the American Ceramic Society, "in recognition of productive scholarship in ceramic science and notable contributions to the ceramic arts and industry."

Bob Knopf was married October 8 to Barbara Jean Cope, at the Wright-Patterson A.F.B. Chapel. On November 25, **Gerry Burns** and Betty Remy were wed in Oklahoma City. After a honeymoon in Mexico City, Gerry and Betty stopped on their way back to Cincinnati for an overnight visit at the **Gooch** household in Fort Worth.

Armand Tanguay, we learn, gave a paper a year ago at the Space Trajectory Symposium which is slated for publication as a book. He was co-author of a paper in the April FRE on Photon Propulsion. He also finds time to serve as vice president of the M.I.T. Club of Orlando, Fla., and as an Educational Counselor. He and Cathy have three children. . . . **John Tazewell,** now a commander, served a tour of duty at the Bureau of Weapons as Tartar Missile Project Officer and his next tour makes him C.O. of the U.S.S. Laffey (DD 724). He and Betsy have five children. . . . **Harold Teubner,** a colonel, was assigned to London in July of 1958 to assist the R.A.F. and the British Ministry of Aviation on research and development projects. He and Helen have two boys and two girls. . . . **John Thomas** left Massachusetts for Wisconsin, where he is manager of Advanced Development and Research for Globe-Union, Inc. He and Marjorie have a boy and a girl. . . . **George Thompson** reports a promotion to the position of Senior Engineer. . . . **Mark Thomson** is vice president of Tanner, Thomson, D'Alli and Heartz, Inc., engineers and project managers, of Melbourne, Fla. His work has included the design of facilities at Cape Canaveral. . . . **Ralph Thornton** is building a new home in Connecticut for Eleanor and their four youngsters.

Dick Towill, in Honolulu, reports he and Pat have a son, Richard. . . . **Milt Trageser** is living in Waltham, Mass., with Evelyn and their three. . . . **Theodore Trimble** is developing gas turbines at Ford besides hunting and building sailfish. He and Vera have three boys and a girl. . . . **Alden Tschaeche** has been dosimetry supervisor, Reynolds Electronics and Engineering Co., at N.T.S., Mercury, Nev., since 1958. He and Helga have two children. . . . **Bernard Varney** entered the life insurance field where he "engineers" income, tax savings, and employee benefits. He and Mary Jo and Elizabeth live in Arcadia, Calif. . . . **Wheaton Vaughan** was appointed European manager of Commercial Chemical Co. . . . **Herb Voelcker** is researching and lecturing in communication theory and psychoacoustics at the Imperial College of Science and Technology in London. He and Jean and John enjoy life in Britain. . . . **Dan von Recklinghausen,** chief research engineer at H. H. Scott, was last spring named one of the Ten Greater Boston Young Men of the Year. Last July, he and Carolyn Seibert of Terryville, Conn., were married in Waterbury. . . . **Dick Vyce** is project engineer in charge of development of Polaris Submarine Navigation System Optical Instrumentation for the Perkin Elmer Corp. in Norwalk, Conn. . . . **Kenneth Walijarvi** has his own practice as an architect with two employees. Recent commissions were for a church, a convent, a nursing home, and remodeling an office building. He and Betty Jane live in Edina, Minn., with their two children—**Richard W. Willard,** Secretary, Box 105, Littleton, Mass.; **Robert S. Goch,** Assistant Secretary, 407 Danciger Building, Fort Worth, Texas.

'52

This column is being written during the snow and slush of the first big snowstorm of the year with your secretary just back and disgruntled from a warm vacation in Florida, and wondering if the darn stuff will be on the ground when this column appears, later in the winter.

An interesting clipping from the Boston Traveler is on my desk describing the activities of Wakefield Engineering Inc., a company started in 1957 by **Thomas Coe,** which makes transistor coolers ("heat sinks") and which has grown rapidly during the last few years. Best wishes on further expansion. . . . Letter from **Edward Wright** catching up on his activities, which included two years in the USAF SAC as a management analysis officer in New Mexico, starting an independent company named Hi-lite Safety Products Co., North American Aviation Missile Division, and Bettis Atomic Power Lab of Westinghouse in Pittsburgh. Ed is now attending Carnegie, expects to receive his M.S. in June, 1961, and has been doing consulting part time including work for Rolls Royce in England. And Ed and **Jim Weissburg** have just formed a Management and Engineering Consulting team, offering services to all comers, especially "civilian-type" concerns as opposed to military. . . . From Englewood, N. J., **John J. Dieckmann** writes that he is now assistant to the President of Jet-Heet, Inc. . . . **Cliff Sayre** writes that he is with the E. I. Du Pont Research Division in Charleston, W. Va., working on catalysts for abatement of motor vehicle fumes, and has spoken on the subject to California's Motor Vehicle Pollution Control Board.

Ralph Bell is with Thompson Ramo Wooldridge Inc., in Cleveland with the Power Systems Works as supervisor of Cost Analysis and is doing quite a variety of engineering and financial work. He mentions new son Ralph in 1960, and that he is active with the AIIE in Cleveland, being in charge of Professional Development. . . . **Norman Niederman** is with the USAF as a Captain in the Ballistic Missile Division working with the TITAN ICBM as a Project Officer for Mechanical Ground Equipment, and just mentions a three-week family vacation in Hawaii (there's that warm climate again, darn it). . . . And **Arnie A. Kramer** writes from Worcester that he is production supervisor in Mechanics Upholstering Co. (furniture) and has a ski lodge in Woodstock, Vt., where he spends his winter weekends. . . . **Ted Maione** writes that he is an engineer with Bell Telephone Labs in Murray Hill, N. J., working on Long Haul Submarine Cable Systems (and with **J. J. Kassig** in the same department). Mentions that he and wife Joan have been married six years, and have three youngsters, Susan, Ted, and Marianne. . . . And from **Al** and Fran **Kandel** comes the announcement of the birth of Susan Ellen. They have moved up to Nashua, N. H., where Al is now working for Saunders Associates.

Jim Stolley is with the Beckett Paper Co. in Hamilton, Ohio, as assistant general superintendent in production. . . . **Norman D. Andreas** is with Bausch and Lomb, Inc., as a design engineer of Ophthalmic Instruments in Rochester, N.Y. . . . And **Bob Donovan** is with Westinghouse Air Arm in Baltimore, Md., as an engineer in the molecular electronics section. . . . **Alfred Hofstatter** is with Ryan Aeronautical Co. in San Diego, Calif., as supervisor of the Instruments and Standards Laboratory and is working for his M.S. in Industrial Management at San Diego State College. . . . **John Warner** is working on his Ph.D. in Economics at the University of Toronto, Canada, and has a Ford Foundation Fellowship relating to the development of Canadian Secondary Industry. Mentions receiving his M.A. in economics from the University of Alberta in September, 1960. . . . **Robert Mayfield** is with Fenix and Scisson Inc. of Tulsa Okla., as chief engineer. . . . And **Donald Jaffe** is with Westinghouse Bettis Atomic Power Lab in Pittsburgh, as a metallurgical engineer, and is on the doctoral program sponsored by Bettis at Carnegie Institute of Technology.

Bill Morse is in Columbus, Ohio, as an engineering test pilot for North American, currently flying the A3J-1 Vigilante, and mentions new addition Gregg Richard in late summer. . . . **Richard L. Brown** is the Brown in Reiss & Brown, Civil and Structural Engineering, in Los Angeles, Calif. . . . **Alfred J. Kargl** is a development project engineer on food processing machinery with Emhart Manufacturing Company in Hartford, Conn. . . . And also in Connecticut, **Palmer S. Shannon** is an electrical contractor specializing in special power applications and feed problems as owner of The Electric Construction Co., in Glenville, Conn. And that about closes out the mailbag for this month. Keep up the good work and write—all of you.—**Dana M. Ferguson,** Secretary, 242 Great Rd., Acton, Mass.

'53

Class Notes this month will be quite short as I hardly have time to "sneeze." Christmas and the end of the term are upon us; thus the exams and reports fill up many spare hours. And to top it off, yesterday my wife and I were most sur-

prised to greet our second son who was not scheduled to appear for another seven weeks. With Christmas only one week away, you might guess that I am in a slight state of panic! (Now, that's what I call a real Christmas present!)

Wallace Reid has certainly followed a varied (and interesting I would guess) career. As you may remember, he received a B.S. in architecture at Tech, and holds a B.A. in mathematics from the New Jersey State Teachers' College. He practices engineering and architecture in Kennebunkport, Maine, and is an active reservist in a troop carrier squadron. In the latter endeavor, he holds the rank of Major and received Senior Pilot rating earlier in 1960. Last, but not least, he is the proprietor of "The Arundel," a summer hotel at Kennebunkport. . . . **Dan Lippman** is now working for Motorola, Inc., in the Semiconductor Products Division after having spent three years in the service, most of this was spent as a 1st John in the Army Security Agency Laboratory in D.C., and two and one-half years with Goodyear Tire and Rubber Company on automotive air suspension development. Dan and his wife Judy are way out West—Phoenix, Ariz.—and have a two-year-old daughter.

Our class seems to be increasing its Alumni Association activity and holding its own, even in the Alumni Fund. **Paul Shepherd,** our ". . . esteemed and beloved, etc., etc., etc." Class President is a member of the Alumni Council, and **Norm Gardner** is an associate of the council (what is that, Norm?). A number of classmates are officers of M.I.T. Clubs all over the world: **Homer Fay** is president of the club of Buffalo and Niagara Falls; **Jim Mast** is a vice-president in the Detroit association; **Don Gilbertson** is assistant treasurer of the M.I.T. Club of Sunny Southern California. . . . And a Happy Easter to all you good people.—**Martin Wohl,** Secretary, Room 1-131, M.I.T., Cambridge 39, Mass.

'54

Several months ago, we listed the various members of the class who hold offices somewhere within the vast complex known as the Alumni Association. The names were culled from the 1959-1960 Alumni Association Directory. A new directory has just been published and from it we obtain a revised and longer list. . . . **Bob Anslow** is not only our class president, but also our class representative on the Alumni Council and a member of the Personnel Committee of the Council. . . . **Chuck Masison** also holds two jobs; he is class vice president and an associate of the Alumni Council. . . . **Ron McKay** and **Wally Boquist** are likewise associates of the Alumni Council. . . . **Dean Jacoby** is our class agent for the Alumni Fund, as I am sure you are all aware from his annual letter.

On the local alumni club level, we find that the following members of the class have acquired jobs as indicated: Mariano Aveledo, Secretary, M.I.T. Club of Venezuela; Rich Wilson, Assistant Secretary, M.I.T. Association of Cleveland; Joe Kozol, Secretary, M.I.T. Club of Hartford, Conn.; Dave Leslie, Secretary, M.I.T. Club of Southern Florida; Charlie Riley, Secretary-Treasurer, M.I.T. Club of Orlando, Fla.; Leon Michelove, Treasurer, M.I.T. Club of Schenectady; Alex Pausley, Secretary-Treasurer, M.I.T. Club of Central New York; D. J. Athan, Assistant Secretary, M.I.T. Club of Central Florida. We also have our representative among the officers of the M.I.T. Women's Association, where **Anna Bailey** is Recording Secretary.

The Educational Council of the Institute, whose job it is to maintain friendly relations with local secondary schools and to interview prospective students, has eight members of the class on its current list of Educational Counselors. They are Harry Taylor, Sacramento, Calif.; Dave Leslie, Miami Beach, Fla.; D. J. Athan, Tampa, Fla.; Duane Yorke, Massapequa Park, N. Y.; Art Rouzie, Portland, Ore.; Mike Boylan, Houston, Texas; John Bradshaw and C. J. Carpenter, Norfolk, Va.

As far as our class officers are concerned, those of you who were not able to attend our reunion a year and a half ago are probably not aware of the fact that, in addition to the officers mentioned above and myself, we have five Regional Vice Presidents. Their job is to help keep track of the members of the class living within their regions. They are listed here by region: New England-New York—**Wally Boquist,** 9 Bay State Road, Boston, Mass.; Midwest-North—**Rich Wilson,** 1372 Summit Drive, Mayfield Heights 24, Ohio; South—**Fred Bowis,** 5717 Ogden Road, Springfield, Va.; Mississippi River to Rockies—**Mike Boylan,** 2727 Steel Street, Houston 6, Texas; West Coast—**Sam Losh**, Apt. 35, 4510 Pinafore Street, Los Angeles 8, Calif. Any new addresses or news items for this column can be sent to the gentleman listed above for your region, or to me. But wherever you send the information, please send it.—**Edwin G. Eigel, Jr.,** Secretary, 321 North Thomas Street, Arlington 3, Va.

'55

These notes were intended for last month's issue of The Review, but their publication was deferred because of space limitations.

A lot of classmates have new jobs, and judging from the heaps of "change of address" slips pouring in there are probably many more who do, about whom we have no information except a new residence. **Gregory Robillard,** who received an M.B.A. from Harvard Business School this spring, has become a sales trainee of the Cummins Engine Company in Columbus, Ind., producers of lightweight, high-speed diesel engines for trucks, locomotives, etc. Greg and Rosanne now have two children. . . . **Pete** and Jackie **Pratt** are now living in Oregon, where Pete is a management trainee with the Roseburg Lumber Company, presently working in their plywood mill. Pete too received a degree in June in business administration—from Stanford. . . . Also on the West Coast, **Duwayne Peterson** and Nancy and their two boys have moved into a new home in Lakewood, Calif. Pete is in the Los Angeles Commercial Division of Minneapolis Honeywell, a sales engineer. . . . Working our way eastward back to the hub of the universe, **Dave** and Toby **Brooks** plus two little ones are still raving over Colorado, and they'll continue to enjoy it, since Dave has been awarded an NDEA fellowship for three years of study for his doctorate in economics. He's quite pleased with the work in economics, divided the summer between a special institute, where he taught foreign students just coming into the U. S., and the great outdoors. Toby too has been at work with the League of Women Votes and another committee aiming to improve working conditions for migrant laborers in Colorado. . . . Really in the wilds, **Dick MacCammon** is teaching at the University of North Dakota in (get out your maps) Grand Forks (it's almost in Minnesota). He reports the arrival of a new son, the second offspring. . . . Back East **Leonard Salvador** has been appointed assistant planning engineer for the city of White Plains, N. Y. Since 1955 Leonard has spent two years with the Air Force, acquired a master's degree in planning at Harvard (1959) and worked with Skidmore, Owings, and Merrill in New York and Adams, Howard, and Greeley, city planning consultants, in Boston. He and Marion now have a baby daughter and are living in White Plains. . . . **Nils Skorve** and Betty Lou have returned to New England from Lakeland, Fla., where he was vice president and chief engineer of Leap Associates, consultants in prestressed concrete. They are now living in Laconia, N. H., Nils having been appointed chief engineer in charge of design and production of prestressed concrete in the Structural Concrete Corporation of Laconia-Franklin. . . . **Walt Shifrin,** who since 1958 has been a consulting engineer with Horner and Shifrin in St. Louis, presented a paper in October at the annual meeting of the Water Pollution Control Federation in Philadelphia. Walt received an M.S. in sanitary engineering at Tech and worked with the Public Health Service of Kansas City, Missouri, and the St. Louis Sewer District prior to 1958. . . . **Marty Gilvar** and **Barry Lucas,** who deserve our thanks for much of the above news, have been making a bit themselves. Marty, a project engineer with the Morgan Construction Company in Worcester, Meg, and little John have recently moved into a new home in the country around Westboro. Barry is now a research and development engineer with the boiler division of Combustion Engineering, still living in Bloomfield, Conn. The big news with him is his coming marriage to Barbara Ann Parkhurst early in 1961. So congratulations in addition to thanks!

The ever-expanding M.I.T. Club of New York has lost the services of **Bob Temple,** who has evidently moved northward; but it is good to see that **Bob Mor-**

gan is really devoting himself to that organization. In addition to serving on a committee to implement the formation of a group investment plan, Bob is in charge of a series of eight seminars to be conducted in cooperation with prominent industrial organizations for the purpose of encouraging engineers to undertake management responsibilities. Bob is now with Booz, Allen, and Hamilton in New York, having completed his work at Wharton.

Now to revert to the summer a moment; follow this closely! In June, **Bernard Wuensch** was married to Mary Jane Harriman of Swampscott, a graduate of the Vesper George School of Art; best man, **Norman Kulgein.** In July, Norm and Nina Zidle of Lawrence, a June graduate of Simmons College School of Nursing, were married; best man, Bernard Wuensch. The Wuenschs honeymooned in New Hampshire and Maine, then set out in July for France and Germany en route to Manchester, England, where Bernard attended a summer session at the Manchester College of Science and Technology under a NATO grant. The Kulgeins traveled briefly to New Hampshire before leaving for Europe for a summer of touring. Norm and Nina are now living in San Francisco where Norm (M.S., 1956, M.I.T.; Ph.D., 1960, Harvard) is with Lockheed and Nina is doing graduate work in psychiatric nursing at Berkeley. Bernie and Mary Jane are living in Cambridge, were he continues work on a doctorate in crystallography having completed his M.S. . . . Another aspirant to the doctorate, working in crystallography is **Charlie Prewitt.** Charlie left Boston long enough to attend a summer course in crystal structure analysis in (you guessed it) Manchester, England, under an NSF grant, after working earlier in the summer at Raytheon.

Dough Wixson is hoping to visit the USSR next summer and thus did some "boning up" on the Russian language at the University of Washington summer school after just emerging from Stanford with another degree. . . . Up Seattle way also, **Andy Henesteg** continues his life of un-married bliss. Well, actually he's a polygamist, being divided between a sports car and a sloop, not to mention a few alumni activities in the area (among other things, he's a committee member of the Second Century Fund). Andy's work with Boeing takes him all over the country; so if you think you see Andy not in Seattle, you may be right. —Co-secretaries: **Mrs. J. H. Verande,** 107 Mullin Road, Wilmington 3, Del.; **L. Dennis Shapiro,** 15 Linnean Street, Cambridge 38, Mass., ELiot 4-4901.

'56

As the school year rushes on spare time dwindles but the activities of our group increase. Thanks are extended to those who enclosed a short note with their dues. For an interesting comment on fifth reunions be sure and read the Class of '55 notes in the November Review.

Philip Bromberg is with the Chemistry Department at the University of Chicago. . . . Dr. **William Calvert** is at Pennsylvania Hospital in Philadelphia. . . . **Joseph Huber** is teaching math at Akron University in his spare time. . . . **Keung Luke** is at Gonzaga University in Spokane after receiving his S.M. at Tech. . . . Dr. **Richard Mateles** is with the Department of Food Technology at Tech after receiving his doctorate there. . . . **William Orttung** and **Thomas Jones** are with the Department of Chemistry at Stanford. . . . Dr. **Earle Ryba** is at Pennsylvania State. . . . **Robert Witonsky** is at the Department of Chemistry at the University of Pennsylvania.

Charles Benjamin is with Space Technology Labs in Los Angeles. . . . Dr. **Paul Berenson** is with A. D. Little in Santa Monica after receiving his doctorate at Tech. . . . **Joseph Coccoli** is back at Tech. . . . **Robert Lukacik** and **Regis Schultis** are with Pennsalt Chemicals Corp., in Philadelphia. . . . **Kenneth Meliere** is with Allied Chemical Corp., in Syracuse. . . . **Roy Mennell** received his M.S. in Course XV, worked at the Watertown Arsenal, and is now with A. D. Little. . . . Lt. **Angelo Perciballi** has been flying his C-124 in the Congo airlift. . . . Dr. **Arthur Peskoff** is with G.E. in Philadelphia after receiving his doctorate at Tech. **Clarence Twohig** is with Fay Spofford & Thorndike Inc.

Last October an interesting and long article about **Stan Hart** appeared in a Lynn, Mass., newspaper. Briefly it recounted Stan's degrees, now three including a doctorate in geology from Tech; his present occupation, studying spatial geology at the Department of Terrestial Magnetism of the Carnegie Institute in Washington; and the fact that the Harts have a three-year-old daughter, Jolene.

Please note change in Phil's address.—**Bruce B. Bredehoft,** Secretary, 1094 Center Street, Newton Center 59, Mass.; **M. Philip Bryden,** Assistant Secretary, Apt 207, 3512 Durocher Street, Montreal 18, PQ, Canada.

'57

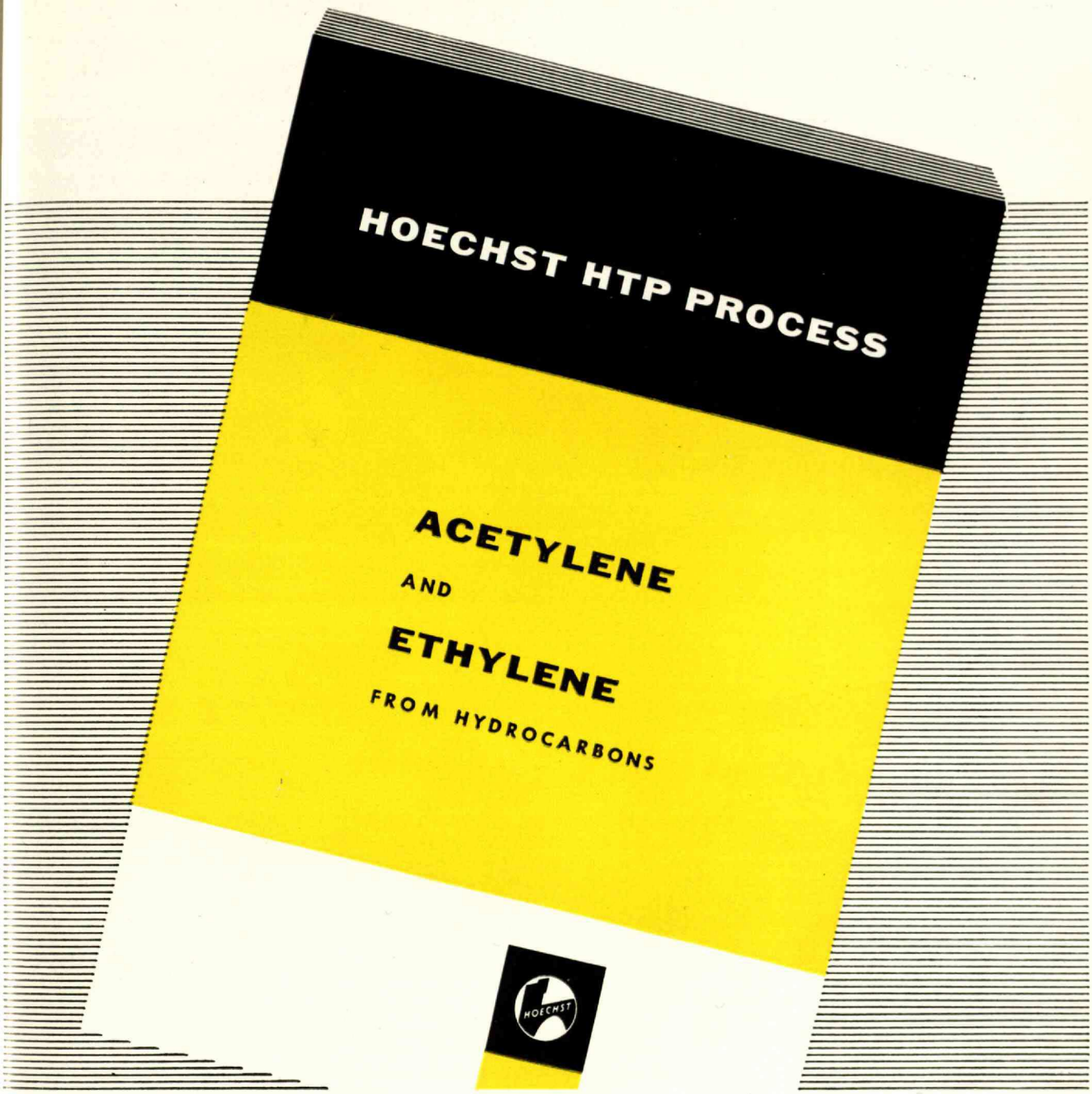
Charley Priesing spoke before the annual meeting of the Water Pollution Control Federation on "New Concepts of Flocculation." Charley is with Dow Chemical specializing in research on water soluble polyelectrolytes. . . . Having reported the June engagement of **Darrell Briggs** to Joan Della Puietra in the last issue, we are happy to report their October wedding in this issue: Darrell is an electronics engineer with Schlumberger in Ridgefield, Conn. . . . The **Ralph Browns** report a new daughter, Pamela Maye Brown, born last September 12. . . . Lt. (jg) **Steve Hawkins** has wed Janet Goodwin, an alumnae of Connecticut College for Women. . . . **Mal Chesley** and Ann Skillings were married last May. Mal is a student at Portland University Law School.

Don Norman worked for Epsco this summer and is now back studying along with his wife, Marty (Karpati), at the University of Pennsylvania. . . . **Joe Rocchio,** who is working on his Ph.D. in Applied Mathematics at Harvard, was recently married to Mary Roan. . . . Also at Harvard is **Don Tufts,** who is an instructor in the Arts and Applied Sciences Division, having received his Sc.D. in Course VI. . . . **Alan Toomre** has returned to M.I.T. and joined the Mathematics Department. . . . **Sumner Abrams,** who is working for Datamatic, and his wife welcomed an addition, Susan, to their home in Framingham in January. . . . On September 10, **Dick Hause** was married to Carol Vega. In attendance at the wedding were Marshall, Les, **Stu Keeler, Phil Pearle** with his wife Betty, **Dave Redhead** and **Don Tufts** with his wife. The Tufts now have two children. . . . **Art Bergles** has written to tell of his stay at the Technische Hochschule in Munich as a Fulbright Scholar during 1958-59 after receiving his masters at Tech in 1958. He is now back and is a candidate for Sc.D. in Mechanical Engineering. On June 19, 1960, Art was married in Taunton, Mass.

I had dinner with **Hank Salzhauer** and **Jim Rowan** last November. Jim is a medical student and is presently studying on the West Coast. Between drinks we began to form plans for the fifth Reunion which isn't so far away. Hank put together a Class of 1957 table at the annual M.I.T. Club of New York Silver Stein Award Dinner which included the **Richard Hirschhorns** and **Jules Byrons.** The M.I.T. Club of New York is located in the Hotel Biltmore and is a convenient luncheon spot regularly frequented by **Art Schultz, Steve Friedman, Ira Zames** and this writer of our class as well as by numerous graduates of other classes. Non-New Yorkers are invited to become members. . . . Finally, **Stuart Keeler** has become engaged to Denise Bradshaw. Stu is now completing his requirements for his doctorate in metallurgy at Tech.—**Alan M. May,** Secretary, 525 E. 81st. Street, New York 28, N. Y.; **Martin R. Forsberg,** Assistant Secretary, 11 Scottsfield Rd., Allston 34, Mass.

'59

I'm afraid I don't have very much to report this month. Mail, lately, has been on the steady decline. I hope it picks up some in the very near future. I did get a nice letter from **Seiji Itahara** the other day. Seiji writes: "After receiving my master's degree in Course X from Tech in June '60, I went to work for American Cyanamid in Bound Brook, N. J. Since September, I have been with the Army at Fort McClellan, Alabama." Thanks for the letter Seiji. . . . I've now finished at Columbia! As of the first of this month, I became an active 2nd Lt. at Fort Lee, Va. So, for the next six months or so, I hope everyone will write **John MacElroy,** Assistant Secretary, 15 Crocker Street, Rockville Centre, N. Y. Hope to read about everyone soon.—**Robert A. Muh,** Secretary, 8 Merrivale Rd., Great Neck, N. Y.



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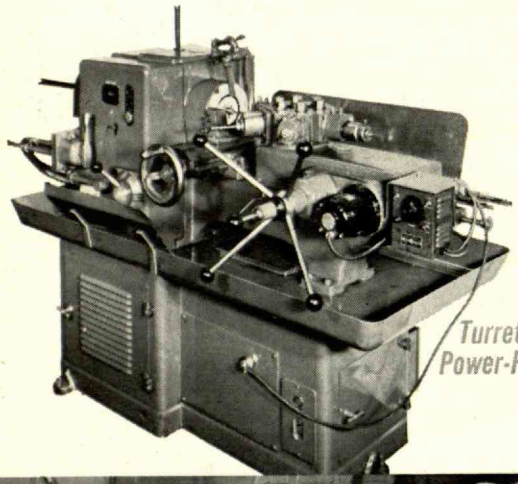

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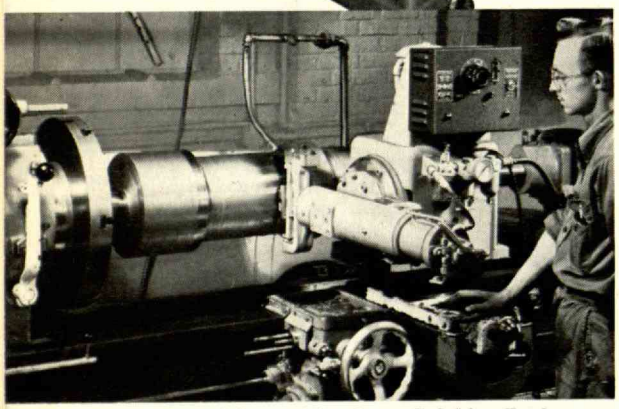

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